PART 6
Agricultural Development, Policies and Governance

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6.1 Land tenure

## Customary ownership

Around 97% of land in PNG is occupied and used under *customary tenure*. This section attempts to provide a basic understanding of customary land tenures. Custom is here defined as the long-established practices of the people of PNG. The principles of land tenure that arise from custom are not written down, but are maintained through time by human memory and everyday practice. Although custom is recognised legally in the laws and constitution of PNG, land used and occupied under customary tenure remains outside any formal state system of land administration. Until recently, this land could only be brought within a state system of land administration through a process called *alienation*. In this process, land was purchased by the state from its customary owners and leased to other users. When land was alienated, the customary owners legally lost all further interest in the land. This permanent loss of interest in land was always resisted by customary owners in PNG and today it is almost impossible to find landowning groups that will agree to land being alienated.

The first laws governing land registration were introduced to PNG in 1889. They provided for the registration of titles in ‘alienated lands’, or land that had been acquired by colonial administrations from customary owners. Until World War II, registered titles were only available to those who occupied alienated land.

After World War II, attempts were made to provide for registration of customary land. The Native Land Registration Ordinance was passed and a Native Land Commission was established to administer it. Around 1960 a Land Titles Commission was set up to hear claims and make decisions about ownership of customary land. In 1972 the Commission of Inquiry into Land Matters, with an all-PNG membership, was set up by the PNG Government to make recommendations on suitable land policies and laws for an independent PNG. The Commission’s recommendations for customary land registration were never fully adopted but some legislation based on the inquiry was passed, including the Land Groups Incorporation Act and Land Disputes Settlement Act.

During the 1990s, under the influence of policies that argued that economic development depends on land registration, the World Bank attempted to persuade PNG to accept a Land Mobilisation Project that included the drafting of customary land registration laws. This project was to be trialled in East Sepik and East New Britain provinces. The laws were drafted but the trials were never carried out. In 2001, rumours began circulating that the World Bank was trying to take possession of customary land. This led to public protests and riots in which four people were shot by police.

In the absence of a suitable law for the registration of interests in customary land, the state has moved towards the option of temporary alienation. Under Section 11 of the Land Act 1962, the state can lease...
customary land from the recognised customary owners and then lease the land back to them as a legally incorporated body, or to another individual or body, designated by the owners. At the end of the lease, the land reverts to customary tenure unless a further lease is negotiated.

Landowning groups

The largest social groups, sometimes known as ‘tribes’ or ‘language groups’, occupy large areas that can be viewed as territorial domains. The rights to the territorial land may be held by the group as a whole, or by parts of the group, and are protected against infringements by agreements with neighbouring territorial groups, and if necessary by force. The size of territorial domains may vary from a few hectares to many square kilometres, and the groups that occupy them may number from a few hundred to thousands of people. The rights to occupy a territorial domain may be determined by kinship or by historical circumstance. Large landowning groups are often held together by the mutual advantages of shared labour and defence, as well as by constant references to kinship, tradition, history, culture and language.

Within a territory, smaller landowning groups that make up the territorial group are composed of people who say they are descended from a common ancestor. For this reason these groups are often known as ‘descent’ groups and in PNG they are often loosely called ‘clans’. However, what determines clan membership can vary widely across PNG and the uncritical use of the term ‘clan’ can create considerable confusion and misunderstanding. Customary landowning groups are based on a dominant ethos of kinship in the broadest sense of that term, but legitimate membership of a landowning group is rarely determined only by biological descent.

The rights of landowning groups to the land they occupy are established through agreed-upon histories that describe how they came into being and how they came to occupy the land. In the case of disputes, it is often these histories that are disputed, rather than the boundaries of the land concerned. The particular historical events that endorse rights to occupy land are remembered by repeated storytelling. Particular individuals, usually older men, hold this knowledge and are relied upon to argue the historical precedents and principles, should disputes arise.

Landowning groups are commonly made up of a number of related extended families. In some places, the families may be the descendants of a number of ancestral brothers, the sons of the original founding ancestor. In other places the families may trace their descent through female ancestors. In yet other places, membership rules allow affiliation to be traced through descent from both male and female ancestors, such that the line of descent that an individual traces may jump back and forth between ancestral males and ancestral females. Intelligent, forceful men can argue their rights as landowners by either knowing these histories better than other men, or by being more skilled than others at manipulating the histories and presenting them more convincingly in public.

Importantly, some members of the landowning group will be individuals whose ancestors were incorporated into the group, by adoption for example, at some time in the past, perhaps hundreds of years ago. They will not be able trace a biological descent from the founding ancestor. Enough cases of non-descent incorporation into so-called ‘descent’ groups exist in PNG to argue that ‘descent’ group is an inappropriate term for a landholding group, even if the central ideology of most landowning groups is one of descent from a common ancestor. Adoption into a landholding group and change of group membership is a typical feature of PNG land tenure systems. The ability to transfer individuals serves to continually adjust the numbers of people to the amount of land available. It also ensures the survival of individuals from groups that have gone into decline because of the uncertainties of reproduction, mortality and warfare. However, adoption and change of membership of landowning groups is frequently poorly understood or not recognised at all by non-villagers who simplify rights to descent from a single male ancestor.

The means of determining rights to land within landowning groups vary from place to place and from group to group. Rights to land are determined by very local histories that are recorded only in the memories of the living. Within a single
village, hundreds of individual pieces of land have particular histories. It is very difficult to predict the circumstances that will have led to any particular family owning any particular piece of land. Previous attempts to adjudicate land disputes in PNG have been forced to rely heavily on the merits of each particular case as argued by the disputants and local experts, and rarely on generalised principles of rightholding. An outsider wishing to determine the rights to a piece of land must understand the particular circumstances related to it. This can be a time consuming and tedious business, especially as some informants can be senile, confused and forgetful and some will present a case that favours their family’s interests over those of other families. However, if membership of the landholding group is not properly investigated, great injustices can occur and major disputes can be generated.

All members of the landowning group are expected to meet certain social and economic obligations to other members. Through the exercise of these obligations and by daily social interaction, the rights to use land are maintained and strengthened. Group members who have been absent from the village for some time and who are presently not occupying or using land also often try to meet these obligations. They do so to ensure that, if need be, they or their children can return and exercise their rights to land in the future. Migrant parents are especially careful to show their children to their home-based siblings and cousins and to tell their children the locations and names of the pieces of land to which they have a legitimate right of use.

### The land and its use

The landholdings of a particular landowning group may not be continuous, but may comprise a number of pieces of land scattered within a larger territory. The land claimed by families within the group’s land may comprise a large number of very small areas of land. These individual pieces of land may be as small as 150 m$^2$. While land parcels may be used by an individual family, the rights to use them will probably not reside in one person, but in a number of close relatives, such as the brothers or cousins of the user. The rights held by different people in the same piece of land vary in nature and in degrees of importance. The use of the land for cultivation or another use may be decided from time to time by consultation within the family.

It is not necessary to be a customary rightholder to a piece of land to use it temporarily. A great deal of land is cultivated by a non-rightholder, with the permission of, or at the request of, the customary rightholder. When a person who does not have rights to a piece of land uses it without paying a rent, the use is known as usufriuct. For many reasons, including shared labour arrangements or to ensure the maintenance of marriage, exchange and social relationships, the rightholders to a piece of land will invite non-rightholders to cultivate it. This is also how people who cannot establish rights to land within a group, such as in-marrying widows or recent migrants, can be given land on which to grow food and build houses during their lifetimes.

Usufructuary arrangements are usually limited to growing annual crops. People invited to use land to which they do not have rights are commonly prevented from planting trees, particularly export cash crop species like coffee or cocoa, but also food-producing trees such as breadfruit, ton, sago and coconut. Tree planting (and the burial of the dead) is usually interpreted as a public affirmation of right-holding. Even though much land is cultivated under usufructuary arrangements, it can be difficult for women and unmarried men to gain access to land on which to plant tree crops or to develop cash-earning business enterprises.

### Change in customary tenure

Customary land tenure systems change over time. If, for example, population increase causes people to feel anxious about whether enough land will be available for their children or grandchildren, or if the land suddenly acquires a monetary value, as in the case of a logging or mining project, customary tenure systems may change quickly. Changes may include an insistence that group membership, and hence rights to use the group’s land, is restricted to only male descendants of a putative ancestor;
the exclusion from the landowning group of the descendants of people who were adopted into the landowning group; or the ejection of people from land that they have used under usufruct arrangements for many years.

Some commentators on economic development in PNG assert that national economic development will be seriously constrained unless land is registered so that individuals can obtain legal title to land. These people argue that the economy will not grow until a market in land has been created. They contend that this will allow the most innovative and energetic individuals to accumulate land and so achieve economies of scale in farming, and enable landowners to raise capital by borrowing against their land as security. Whether or not these arguments have merit, the technical difficulties of registering individual titles in PNG should not be underestimated. The possibility that large numbers of people could lose their rights to land they are presently using should also be borne in mind. The present state land registration system struggles to administer the 3% of PNG's land that is alienated. A registry of customary land would have to be able to deal with thousands of changes of ownership annually, under circumstances where the customary owners will not be able to afford to travel to an administrative centre to register the changes. If land changes hands, but the changes of ownership are not registered, the disjuncture between the situation on the land and the records in the registry will soon grow to proportions that would render the system unworkable. The tasks of surveying the land, issuing titles and maintaining a land register, and of devising a new system of tenure that does not result in many people being disinherited, is presently beyond the competency of the PNG state.

Nevertheless, there is an urgent need, in some places, to survey the boundaries of land at landowner group level. There are circumstances in PNG where customary tenure systems are struggling to cope with rapid social or demographic changes occurring in the landholding group, or where urban development or other non-customary uses have spread onto customary land. There is a need to establish legally recognised surveys at a lower level of accuracy than is presently required by law. Legislation that defines membership of landowning groups and that allows land to be used by non-customary owners while the customary owners maintain an ongoing interest needs to be further developed. There is also an urgent need to teach more Papua New Guineans how to undertake the onerous and often tedious work required to properly establish the membership of customary landholding groups and the complex multiple rights that can be held by a number of individuals or groups in the same pieces of land.

Sources


6.2 Agriculture and gender

Gender refers to the distinction that all human societies make between ‘male’ and ‘female’ and how these distinctions are expressed in the everyday relationships between men and women. Melanesian societies express the relationships between men and women and the production, exchange and consumption of things in complex ways. These include the ownership and inheritance of land, the division of labour, the ability to exchange or distribute agricultural produce, and restrictions over whether, where and when, men and women can cultivate particular plants.

Debates over whether gender relations in Melanesia are exploitative of women are not discussed here. It is common for gender relations in PNG to be seen in terms of men dominating women. Print media, in particular, frequently report cases of women being disadvantaged in a range of everyday activities. Physical violence against women, including rape and other violent assaults, especially in urban areas, is reported daily. Some feminist scholars have argued that in pre-colonial societies, the view that women were disadvantaged is an oversimplification and a misinterpretation of how Papua New Guineans customarily perceived exchange, labour and the value of what was produced. They also argue that such a view fails to take into account complex domestic relationships of production at the household level. However, other scholars have argued that, in the societies they have studied, women were significantly disadvantaged.

Regardless of whether pre-colonial relations were exploitative or not, it is likely that contact with colonial institutions brought about changes in gender relations in PNG that worsened the position of women. Colonial officers were almost all male. Some older PNG women allege that members of the armed male police force regularly sexually assaulted village women. An indentured labour scheme was restricted to men and the introduction of cash cropping also favoured village men.

Gender and village production

Most agricultural output in PNG, other than that from plantations, is produced by a man and a woman, from land that has been accessed through complex family tenure arrangements (see Section 6.1) and with labour that is managed through generally harmonious domestic relationships. A highly successful man is usually married to a hard working and ambitious woman. Unmarried men or women are rarely outstanding agricultural producers or persons of importance in the village, unless they are aged. While men may denigrate or make fun of women’s skills and knowledge in public, in private many express pride at their wife’s critical contribution to the household economy.

The marriage that brings a productive family into being links it with the families of both the husband and the wife. The land that the family uses for
agriculture is often obtained from the husband’s family, his father, or his mother’s brother, but it will not be unusual for some of the land used to belong to the wife’s father or brother. The plants that they cultivate will have been brought into the marriage by both partners and they will continue to source seeds, cuttings and tubers from both their families. The families will exchange labour and food. The children from the marriage will, from time to time, reside for periods with their grandparents and uncles and aunts, as well as their parents.

In most parts of PNG, men and women work together in their gardens, sharing almost all of the labour and the contribution of knowledge and skills. Men, with help from other males, usually undertake the heavier work of clearing, fencing and preparing land for planting. Women remove slashed material, make heaps for burning, and do most of the planting, weeding and harvesting of food crops. In some places, women do not plant certain crops. For example, yams are usually planted and harvested by men, although some varieties are set aside for women to plant. Other crops, sweet potato for example, appear to have few restrictions on who can plant, weed or harvest them.

Examples of differences in the work done by men and women are illustrated in Tables 6.2.1, 6.2.2 and 6.2.3 with data from a village in Simbu Province, two villages in Southern Highlands Province, and a village in the Nomad area of Western Province. The marked differences between men’s and women’s labour contributions for certain agricultural activities is clear from these three studies.

In many PNG societies domesticated plants are believed to have spirits and must be spoken of and handled with respect. Furthermore, men perceive that women are closer to ‘nature’ than men are, because women menstruate monthly, in synchrony with the moon, and because they can bear children. Many rituals are performed to control natural forces, like the reproduction of plants and animals and to appease the attitudes of natural spirits towards humans. Likewise, many attributes of human reproduction (female genital secretions, menstrual blood, placenta) are thought to be detrimental to plants as well as to men, and there are many restrictions placed on the everyday behaviour of women – what they can plant and what they can do inside and outside the garden. For example, in many parts of PNG women never step over plants or food, they do not enter gardens if they are menstruating or have recently given birth and they usually do not urinate or defecate in or near gardens. The contribution of women to agriculture in terms of physical labour expended is difficult to measure quantitatively. In low intensity systems, men and women spend about the same amount of time in gardens, with men doing the heavier work. However, where land use is more intensive, women contribute more labour. In more intensive systems, fields are cleared and fences rebuilt only once every five to ten years. Production becomes a continuous cycle of tilling, planting, weeding and harvesting, most of it done by women. In these systems, it is women who work continuously on the land, leaving men more time to spend negotiating exchanges, marriages and to become involved in cash cropping. Women also carry most of the food and firewood to the home and are responsible for raising and feeding pigs. These demands are additional to the work required to care for children and to prepare and cook food.

**Gender and cash cropping**

In most PNG villages, cash is earned by selling fresh food in local or urban markets (see Section 5.3) and by producing and selling export crops such as coffee, cocoa, copra and vanilla (see Sections 5.4, 5.5, 5.6 and 5.14). Women sellers significantly outnumber men in fresh food markets in PNG. However, men tend to be more involved in long-distance marketing, for example, the sale of highlands produce in Port Moresby, Lae or Madang food markets. A number of reasons have been suggested to explain the dominance of women in marketing fresh food: that women do not have the opportunity to earn cash from other activities, such as labouring or selling export crops; that women are not able to travel longer distances to urban and regional markets; that the role of women in carrying food to the village has been extended to carrying it to the local marketplace; that men see selling small amounts of food in markets as demeaning; and that men and women
sell ‘masculine’ and ‘feminine’ crops, as determined by the local culture. All these possibilities remain speculative, or may apply in some places and times, but not others.

It is generally agreed that women earn less money selling food in markets (5–15% of the annual household income) than men do from selling export cash crops. However, the importance of fresh food marketing as a source of income is not in the absolute amounts earned but in the number of women participating in selling. The cash earned from fresh food sales accrues to adult women whose access to other income sources is limited and the contribution of women’s income to the welfare of children is significant. It seems to be widely agreed that if women sell products that they have grown, the income earned is theirs to keep and spend as they see fit.

Women are also heavily involved in harvesting and processing export crops, such as coffee and cocoa, but are less involved in selling them. As a result, men receive the majority of the income from village cash cropping. There are, however, many ways in which money from the sale of cash crops is allocated within the household and this is not well documented. It is known that in some households, for example, members of the household, including older children, take it in turns to harvest, process and sell cash crops and they keep the income for themselves. Where unprocessed coffee cherry can be sold to an itinerant buyer on the roadside or unprocessed cocoa beans sold directly to fermentaries, women are likely to receive more of the earnings. This is usually only possible if husbands, fathers or brothers agree that women can have access to the trees, which are commonly viewed as belonging to men. In many places, the sons of a widow will give their mother access to some of the coffee or cocoa trees that they have inherited from their father, until her death. In many parts of PNG cash cropping was associated with cooperatives. Although most cooperatives are now defunct, it is of interest that the proportion of women shareholders was small.

### Gender and settlement schemes

A number of formal settlement schemes exist in PNG, including the high-cost oil palm schemes (see Sections 5.7 and 6.7). The oil palm blocks have individual land titles but very few women possess a title to land in these schemes and few inherit the title to the land if their husband dies. This is despite women contributing as much as 40% of the labour on the blocks. Men also tend to control the income from palm fruit sales, which is paid directly into accounts in their name. The planners and implementers of the land settlement schemes were male administrators and they made no arrangements other than for the names of males to appear on the titles, or on the bank accounts associated with the palm fruit sales.

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**Women significantly outnumber men as sellers in fresh food markets in PNG. These images are from the Madang market in June 2006. Photos: Tracy Harwood.**
A recent innovation (the Mama Lus Frut Scheme) that allows money for fruit sales to be paid directly into women’s accounts has resulted in substantial increases in production and in the proportion of cash income received by women.

A similar pattern has been observed on low-cost settlement schemes, where the proportion of female titleholders is universally small. A number of schemes based on low-priced products such as copra or rubber have failed economically. It has been the settler women growing vegetables on the blocks and selling in local markets that has provided settler households with a cash income.

Under the Plantation Redistribution Scheme, land formally acquired (in the process of alienation – see Section 6.1) by foreign plantation owners was repurchased by the government and returned to customary owners. Evidence suggests that the outcomes of this scheme were less gender-biased than the settlement schemes. In redistributions on

<table>
<thead>
<tr>
<th>Table 6.2.1</th>
<th>Division of labour by gender, Koge village, Simbu Province[a]</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Activity</strong></td>
<td><strong>Percentage contribution[b]</strong></td>
</tr>
<tr>
<td>Activities carried out mainly by men</td>
<td></td>
</tr>
<tr>
<td>Fencing</td>
<td>98</td>
</tr>
<tr>
<td>Courting</td>
<td>96</td>
</tr>
<tr>
<td>Nut pandanus cultivation</td>
<td>91</td>
</tr>
<tr>
<td>House construction</td>
<td>88</td>
</tr>
<tr>
<td>Local Government Council</td>
<td>84</td>
</tr>
<tr>
<td>Clearing</td>
<td>83</td>
</tr>
<tr>
<td>Firewood (collecting and splitting)</td>
<td>81</td>
</tr>
<tr>
<td>Coffee (maintaining and processing)</td>
<td>77</td>
</tr>
<tr>
<td>Activities carried out mainly by women</td>
<td></td>
</tr>
<tr>
<td>Sweet potato garden (weeding)</td>
<td>5</td>
</tr>
<tr>
<td>Sweet potato garden (planting)</td>
<td>6</td>
</tr>
<tr>
<td>Sweet potato garden (harvesting)</td>
<td>9</td>
</tr>
<tr>
<td>Household (cooking, sweeping, childcare, etc.)</td>
<td>18</td>
</tr>
<tr>
<td>Schoolwork</td>
<td>29</td>
</tr>
<tr>
<td>Pig husbandry (feeding)</td>
<td>33</td>
</tr>
<tr>
<td>Coffee (picking)</td>
<td>34</td>
</tr>
<tr>
<td>Activities carried out by both sexes</td>
<td></td>
</tr>
<tr>
<td>Ceremonies (various)</td>
<td>61</td>
</tr>
<tr>
<td>Disputes</td>
<td>60</td>
</tr>
<tr>
<td>Mourning</td>
<td>56</td>
</tr>
<tr>
<td>Visiting and entertaining visitors</td>
<td>54</td>
</tr>
<tr>
<td>Pig husbandry (moving, castrating, etc.)</td>
<td>54</td>
</tr>
<tr>
<td>Vegetable garden (cultivation)</td>
<td>53</td>
</tr>
<tr>
<td>Tools, equipment, clothing</td>
<td>50</td>
</tr>
<tr>
<td>Marketing and purchasing</td>
<td>47</td>
</tr>
<tr>
<td>Church</td>
<td>44</td>
</tr>
<tr>
<td>Gambling</td>
<td>43</td>
</tr>
<tr>
<td>Pig festivals (bonagene)</td>
<td>40</td>
</tr>
</tbody>
</table>

[a] Data were recorded over three 4-week periods (84 days) in 1972 and 1973.

[b] During this study, the labour contributions averaged 49.8 hours per week by men and 47.1 hours per week by women.

the Gazelle Peninsula, East New Britain Province, 10–40% of block holders were women. However, this is an area where land is inherited through maternal relatives and granting women titles may have been one way families could gain access to multiple blocks.

### Gender and plantations

Since before World War II, village men have travelled as indentured labourers to work on distant plantations, mainly from the north coast of mainland New Guinea to the islands of New Britain, New Ireland and Bougainville (see Section 1.4). It was rare for women to accompany the men and almost none were able to take an indenture. After the war, young men from these areas continued to travel informally to the Islands Region for plantation labour. The migration of men from villages caused changes in women’s garden work in some places, with women taking up what had previously been men’s work, but this was not a universal pattern.

**Table 6.2.2** Division of labour by gender in two villages, Tari basin, Southern Highlands Province[^a]

<table>
<thead>
<tr>
<th>Activity</th>
<th>Time spent (hours per day)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Men</td>
</tr>
<tr>
<td>Horticulture</td>
<td>1.66</td>
</tr>
<tr>
<td>Constructing ditches and pig sties</td>
<td>0.75</td>
</tr>
<tr>
<td>Pig rearing</td>
<td>0.32</td>
</tr>
<tr>
<td>Collecting wild plants, fishing and hunting</td>
<td>0.06</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>2.79</td>
</tr>
</tbody>
</table>

[^a]: Data were recorded in Wenani village in 1993 and 1994 and in Heli village in 1994. A total of 77 adults in the two villages were studied over a 7-day period.


**Table 6.2.3** Division of labour by gender for banana production, Gwaimas village, Nomad area, Western Province[^a]

<p>| Activity                              | Labour inputs (days per hectare) |</p>
<table>
<thead>
<tr>
<th></th>
<th>Men</th>
<th>Women</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clearing</td>
<td>10.8</td>
<td>12.7</td>
<td>23.5</td>
</tr>
<tr>
<td>Suckers[^b]</td>
<td>25.5</td>
<td>15.6</td>
<td>41.1</td>
</tr>
<tr>
<td>Planting</td>
<td>5.3</td>
<td>13.0</td>
<td>18.3</td>
</tr>
<tr>
<td>Tree felling</td>
<td>35.0</td>
<td>0.0</td>
<td>35.0</td>
</tr>
<tr>
<td>Weeding</td>
<td>18.6</td>
<td>37.9</td>
<td>56.5</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>95.2</td>
<td>79.2</td>
<td>174.4</td>
</tr>
</tbody>
</table>

[^a]: Data were recorded over a 15-month period in 1986–1987. Banana provides about half of the food energy in this community. Labour inputs were not recorded for harvesting bunches. Harvesting is shared by men and women, with women contributing more to day-to-day harvests, but men doing more work for large harvests.

[^b]: ‘Suckers’ refers to work collecting suckers from existing banana gardens and transporting them to new garden sites for planting.

Source: Dwyer and Minnegal (1993:11–13).

Also after the war, the Highland Labour Scheme brought thousands of young highlands males to the Islands Region plantations on two-year contracts. Highlands women were excluded from the scheme. However, coffee plantations established in the highlands by foreign entrepreneurs began to employ women from nearby villages as casual labour, sometimes against the wishes of local men. It became common for women to be employed as seasonal casual labour, in picking and processing. Women also assisted employed men in picking, even though they themselves were not formally employed. One plantation manager is quoted as saying, ‘I don’t employ women, but they pick most of the coffee’. Although the evidence is not conclusive, it appears that women were paid lower rates than men for doing the same work.
Summary

Village production depends on day-to-day domestic relationships between men and women. From daily work in producing food, women have an extensive knowledge of plants and the agricultural environment. They are highly skilled horticulturalists. Women contribute at least half of the labour to the production of food crops and cash crops from village gardens in PNG. Women therefore make a highly significant contribution, not only to household production, but also to the foreign earnings of PNG. Without their contribution, agricultural production would be substantially less than what it is. Women outnumber men as sellers in fresh food markets, but they receive less income from this activity than men receive from selling export cash crops. In more formal settings, such as plantations or settlement blocks, women are likely to be paid less or to be discriminated against in other ways.

Sources


Hide, R.L. (1992). Unpublished papers on women in agriculture in PNG: Women and market trade; Women’s participation in agriculture on smallholder land settlement schemes; Women’s participation in estate agriculture; Other issues in women’s participation in agriculture.


6.3 Policy making in the agricultural sector

Policies are political, management, financial and administrative mechanisms for achieving national or other goals. A policy is a plan to guide decision making and actions in order to achieve a stated goal. Policies must be distinguished clearly from laws, which are enforceable in the courts. Policies set out principles and guidelines, but they are not enforceable, except through acts of parliament that establish the principles of a policy as laws.

This section is concerned with agricultural policy in PNG. Agriculture is a complex sector of the economy and involves many factors including the environment, land tenure, food security, export markets, domestic markets, prices of produce, costs of inputs, exchange rates, transport costs, subsidies, gender, education, research, information, labour and quarantine. This means firstly that many government policies impinge on agriculture and, secondly, that good policy making in agriculture is difficult. Thirdly, PNG is sometimes described as a ‘weak state’ because the government frequently does not have the capacity to enforce laws or to ensure that the many parts of a complex bureaucracy implement existing policies (see Section 6.4). Fourthly, because many present-day policies have evolved from the Australian colonial administration, they may reflect situations that have changed from the time they were developed. Lastly, agricultural policy in PNG is further complicated because it impacts directly on the welfare of the majority of the population. These are the people who live in rural areas and produce much of their own food and most of PNG’s agricultural exports.

Colonial policies and Independence

After World War II, Australian colonial agricultural policies had two main objectives: the first was to promote a commercial plantation sector and provide Australian settlers with the ‘full benefits of modern agricultural scientific knowledge’; the second was to promote smallholder peasant proprietorship. This policy resulted in a Department of Agriculture, Stock and Fisheries (DASF) that was a specialist, technically oriented organisation, modelled on Australian departments. DASF research work in tropical agriculture was internationally recognised and was focused on the export tree crops in which PNG had a comparative advantage: coffee, cocoa and coconut. The department was organised and structured by these commodities. In the late 1960s, oil palm was added to these crops.

1 This section is based heavily on McKillop et al. (2007) and McKillop (1981).

2 This department has been known by different titles over the past 60 years. These are Department of Agriculture, Stock and Fisheries (1946–1975), Department of Primary Industry (1976–1985) and Department of Agriculture and Livestock (1986–present).
The colonial agricultural administration had a high level of autonomy to do what it thought best. Professional agriculturalists reported to generalist administrators in Canberra who knew little about the complexities of PNG agriculture, so there was little policy initiative from Australia. Headquarters officials in Port Moresby were isolated from the day-to-day administration of the districts and individual field officers had a high degree of latitude in formulating their own programs. Where they were highly skilled and motivated, this produced outstanding results and their skills and knowledge were passed on to their PNG understudies. Where they were not, the outcomes were sometimes poor.

In the transition to independence, policy making for PNG in Australia and in PNG was increasingly influenced by non-Australians with experience in the decolonisation of Africa and Asia, who criticised, for example, the strong policy emphasis on export cash cropping. They argued this would make an independent PNG less ‘self-reliant’, dependent on the vagaries of world commodity markets and at risk of not producing enough food. Within PNG, ministers of agriculture in the new PNG Government expressed views that heavy expenditure on research was irrelevant to the country’s needs. Outsiders were also influential in persuading PNG’s political leaders to adopt national ideas of equity and self reliance in the form of the Eight National Aims.

In the agricultural sector, the Eight Aims were expressed in a number of contradictory policy goals to achieve greater self-sufficiency in food and to replace the imports of rice and fresh food from Australia. In 1974 however, urban residents demonstrated in the streets against a rise in food prices and the threatened loss of imported rice. The policy response was to establish a Fresh Food Project with central marketing and storage facilities and the establishment of at least 50 large-scale farms to supply the fresh food needs of major urban centres. This briefly undermined the operations of private food-marketing organisations that were then emerging in the provinces and drove them out of business, before it also failed financially after incurring serious losses.

The basic policy issues of food production for urban markets remained unresolved. The goals remained confused between encouraging urban development through low food prices and promoting rural development by supporting higher prices for producers. The rhetoric of food self-sufficiency also brought political pressure to grow cereal crops, particularly rice, to replace imported rice from Australia. Despite many previous failures to produce rice economically in PNG, in the 1970s the cost-benefits and acceptability of cereals were investigated. Heavily subsidised machinery was provided for rice growing at Mekeo in Central Province, where rice growing remained unsuccessful (see Section 2.5).

On the positive side, new food crop cultivars that increased subsistence productivity were introduced. Rural households also improved food security by purchasing food with higher protein and energy content than local foods, using cash earned from export cash crop sales. Purchased food also evened out fluctuations in overall food supply caused by environmental variation.

### Macro-economic policy

Macro-economic policies have had a major influence on the agricultural sector (see Section 4.1). From Independence to the late 1980s, the government followed a ‘hard kina policy’ where the value of the currency was held constant relative to the value of a number of international currencies. Protective measures and subsidies were used to establish sugar and poultry industries during this period. Import bans or tariffs were partially imposed on many imported foods.

These policies inhibited investment and disadvantaged export cash cropping, but advantaged importers of food and other items. From 1989, PNG macro-economics was impacted by a series of severe shocks: natural disasters, external economic factors, internal conflict and poor fiscal management. The introduction of a complex and unmanageable provincial administrative structure; the 1989–1997 Bougainville civil war; the severe 1997–1998 drought; a World Bank/International Monetary

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3 The international currencies were the Australian dollar, United States dollar, Japanese yen, German deutschmark, and British pound sterling.
Fund structural adjustment program; an inability to control expenditure; widespread corruption; and theft of public money brought the economy to the brink of failure. Foreign reserves were depleted and inflation doubled. Under World Bank pressure in 1994, the ‘hard kina’ policy was abandoned, the kina was floated and it fell in value from A$1.09 to A$0.42 by 2005 (Figure 4.1.1). The fall in the value of the currency advantaged rural cash crop exporters and domestic fresh food marketers, but disadvantaged urban dwellers who depended on wages, and rural people who could not access markets.

In 1990 the Medium Term Development Strategy (MTDS) was introduced. It sought to redefine the role and institutions of government to improve rural living standards. The key priorities were health, education, infrastructure and the private sector. Agriculture was placed in the private sector, which was to be the ‘engine of growth’ for productive enterprise. Government involvement in this sector was to be restricted to facilitating access to credit, research, extension, training services, and monitoring the commercial activities of government. However, agriculture has become a less important part of macro-economic policy with each succeeding MTDS plan, a result of its failure to become an ‘engine of growth’ (see Section 6.4).

**Policy as public service politics**

Since 2000, much agricultural policy making in PNG has reflected attempts by the Department of Agriculture and Livestock (DAL) to regain control of the agricultural sector, more than attempts to address agricultural production and marketing constraints. With the corporatisation of the export crop sectors, DAL’s policy-making role became restricted to food security issues and so most attempts to gain influence were made here. Despite a 1989 White Paper on Agriculture that recognised that food supplies and the overall levels of nutrition were generally adequate, policy documents produced by DAL in 2000 claimed that PNG is a food-deficit country with poor food security. The *PNG National Food Security Policy 2000–2010* concluded that, ‘the long-term sustainability of the national food security in PNG is precarious, based on the present trend of over-dependence on imported foods’.

An agricultural economist employed by DAL argued in a 1992 paper that rice production in PNG was uneconomic (see Section 2.5), and a 1993 PNG rice study showed that the cost of producing rice in PNG was more than twice the cost of importing rice. But because these conclusions were unpopular in the increasingly politicised culture of DAL, national officers were discouraged from undertaking rigorous assessments of policy issues, and policy making became increasingly unrealistic.

A submission by DAL in 1998 to the National Executive Council (PNG’s cabinet) proposed the investment of K36 million over ten years for an intensive program to increase rice production. It put forward a 39-member DAL-led implementation team, new housing and vehicles for the team, training of an extension team, technicians and farmers, subsidised seed production and distribution, DAL-operated machinery pools, 1000 ha of irrigated land, and a further 4000 ha of mechanised rain-fed rice cultivation. The National Executive Council approved the establishment of a rice and grain authority and the allocation of K4 million to the rice program in 1999. The *PNG National Food Security Policy 2000–2010* proposed that PNG put some 100 000 ha of rain-fed lowland rice into production in order to produce some 150 000–170 000 tons of milled rice per year. This figure appears to be derived from the amount of rice PNG imported, but no analysis was provided as to how this target might be achieved.

Attempts to regain influence outside the food security area were also made. In August 2001, DAL launched a new agriculture development strategy called *Horizon 2002–2012*. It noted that most agricultural sector industries had declined or been stagnant since Independence and blamed, mostly correctly, inadequate infrastructure, inefficient government marketing services (copra, rubber), the failure of cooperative marketing (spices, honey) and ineffective research and extension services.

But the solutions contained in *Horizon 2002–2012* were often contradictory. The policy supported the principles of decentralisation and an efficient...
private sector as the key force in revitalising agriculture in the MTDS, but also proposed more centralised control of agriculture through legislation, increased government spending and a National Agriculture Development Plan. A cooperative model was proposed to attract private investment into projects on customary land, with the ownership of the projects to be restricted to the members of customary landowning groups, but another part of the plan recommended that the government ‘secure land’ for private investors. Marketing was to be privatised in the coconut industry, but DAL was to take over rubber marketing. An annual budget of K102–108 million was proposed. Not surprisingly, *Horizon 2002–2012* received a negative response from government and the private sector and it was seen as a blatant attempt by DAL to regain bureaucratic control over all aspects of agricultural policy and production in PNG, including the export tree crop sector.

The corporatisation policy has yielded mixed results. The PNG Oil Palm Research Association provides a cost-effective and technically well-managed research program for oil palm. The Oil Palm Industry Corporation has developed effective management and extension services (see Section 6.4). In the other tree crop industries, the results are less encouraging. Generous aid funding during the 1980s enabled the Coffee Industry Corporation (CIC) to rapidly expand its research facilities and extension services, with the latter employing some 300 field staff. When funding to these institutions was sharply reduced in 1997 following the end of donor support and general government budget constraints, a major cutback was required. Continual attempts by politicians to interfere in CIC affairs have also hindered the effectiveness of CIC operations.

Domestic food production has been successful, often despite agricultural sector policies. Domestically marketed food production appears to have kept pace with population growth and has accelerated rapidly since 1998 following the forced devaluation of the PNG currency and recovery from the 1997 drought and frosts, overcoming the constraints of poor governance and an unhelpful policy framework. Nevertheless, significant constraints continue to affect the supply of food to urban markets at competitive prices (see Section 5.3).

### Non-government policies in agriculture

Community response to the breakdown of public sector service delivery has been a proliferation of non-government organisations (NGOs) and community-based organisations (CBOs). These groups are mainly voluntary organisations that seek to initiate local area rural development. Women's groups have been among the more successful and influential. Overall, however, NGOs and CBOs are weak in their analyses of genuine community need and in the identification, design, implementation and monitoring of projects that deliver real benefits to the community on a sustainable basis. In general, NGOs and CBOs are missing from all government-initiated agricultural policy.

### Summary

The capacity of government to respond with appropriate policies to the challenges of the agricultural sector has been seriously eroded during the post-Independence period. The policies of ‘corporatisation’ and ‘privatisation’ have resulted in DAL losing responsibility for most projects, general extension, research and quarantine and for most research, development and extension functions for the coffee, copra, cocoa and oil palm industries. But rather than take up a policy-making role in support of the agricultural sector, DAL has wasted resources, and ultimately influence, by trying to regain its lost functions.

As a result, DAL has produced policies that were based on misinformation and that recommend increased allocations of funds to DAL or to politically popular causes, like rice growing. Policy in the agricultural sector has thus lacked sound analysis of reality or of past outcomes and has been self-seeking and unrealistically optimistic. It is fortunate that an inability to implement these plans and resistance from other parts of the bureaucracy have prevented DAL from inflicting severe damage on the agricultural sector.
Sources


‘Governance’ refers to the processes and systems by which organisations and societies govern themselves. Poor governance has been blamed for PNG’s poor economic growth, deteriorating human development indicators, environmental degradation and inadequate law and order. Although these criticisms of PNG governance have been directed mainly at political governance, some of them also apply to the bodies that govern agriculture, including government departments and commodity boards.

In 2006 the World Bank developed the Worldwide Governance Indicators, which have been used to compare the standard of governance of all the countries in the world. The indicators are based on six measures:

- Voice and accountability – the extent to which a country’s citizens are able to participate in selecting their government, as well as freedom of expression, freedom of association, and a free media.
- Political stability and absence of violence – the likelihood that the government will be destabilised or overthrown by unconstitutional or violent means, including domestic violence and terrorism.
- Government effectiveness – the quality of the public service and the degree of its independence from political pressures, the quality of policy formulation and implementation, and the credibility of the government’s commitment to such policies.
- Regulatory quality – the ability of the government to formulate and implement sound policies and regulations that permit and promote private sector development.
- Rule of law – the extent to which agents have confidence in and abide by the rules of society, in particular the quality of contract enforcement, the police, and the courts, as well as the likelihood of crime and violence.
- Control of corruption – the extent to which public power is used for private gain, including petty and grand forms of corruption, as well as ‘capture’ of the state by elites and private interests.

Ranked on these indicators, relative to the rest of the world, PNG was in the 45th percentile for voice and accountability, in the 24th percentile for political stability, and was at or below the 20th percentile for all the other indicators.

Many aspects of governance influence agriculture, forestry and fisheries production: the provision of health and education services; the law and justice sector; the building and maintenance of transport infrastructure (see Section 6.9); the management of the national economy (see Section 4.1) and local

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1 A percentile rank indicates the percentage of values that lie below any particular value. In this case, on the 45th percentile, 44% of all the countries in the world performed worse than PNG and 54% performed better. On the 20th percentile, 19% performed worse and 79% performed better. For details on how the index is constructed see World Bank (2006).
6.4 Governance

level government. This section, however, is primarily concerned with the constraints that poor governance places on agriculture. It focuses on the public bodies that provide services to agriculture, including regulation, quarantine, research and extension, and concludes that two critical issues affect the performance of these bodies. Firstly, an extremely complex and poorly understood law (known as the Organic Law) governs the relationships between national, provincial, district and local level governments. In these circumstances, even the most hardworking and honest administrator has difficulty promoting economic development. Secondly, the appointment of unqualified and incompetent political supporters, close family and friends to the managing boards of many of the bodies administering agriculture in PNG is widespread. This practice cripples these bodies and creates conditions where good policy development and effective administration is impossible.

Village agriculture

Most food in PNG is produced by customary landowning groups that occupy their land under constitutional rights. In reality, governments have no control over this land or the way in which food is produced from it (see Section 6.1). Food sold in local markets is also almost completely unregulated, except for the fairly arbitrary rules applied to marketplaces. Regulations are made about village agriculture (for example, the restraint of pigs) but they are rarely enforced. Villagers govern themselves with little external interference, yet most policies and plans designed to transform PNG agriculture do not take account of this reality.

Villagers also produce most of the export cash crops in PNG. Because these commodities are sent to international markets, they are subject to greater regulation. However, many of the regulations applying to the production of cash crops are not observed at the village level, and governing bodies have little capacity to enforce them. Once cash crops leave the village, their processing and marketing is controlled by laws, administered by commodity boards (see Section 5.21). The most important bodies are described on page 445 under National-level agencies.

PNG is a constitutional monarchy and a parliamentary democracy. Four levels of government exist: national, provincial, district and local. The national parliament is a single legislature with members of parliament (MPs) elected for five-year terms. The prime minister is appointed and dismissed by the governor-general on the proposal of parliament. The National Executive Council, or PNG Cabinet, comprises ministers who are nominated by the prime minister. MPs are elected from 89 Open electorates and 20 Provincial electorates, sometimes called 'regional' electorates. Provincial electorates have the same boundaries as the provinces and the National Capital District. Provincial members often also serve as a provincial 'governor'. Each province has its own provincial assembly, comprising district MPs, managers and some local level government appointees. Eighty-five Open electorates have the same boundaries as the administrative districts (the other four Open electorates cover the cities of Port Moresby and Lae). MPs usually chair a number of district-level committees responsible for service delivery and planning. These committees include selected members of local level governments and administrators from within the district.

The Head of State is Queen Elizabeth II, represented in PNG by the Governor-General.
In order to win government for his\(^3\) party, the prime minister must form a coalition from the fifteen or so unstable political parties usually represented in parliament.\(^4\) This results in a great deal of ‘pork barrel’ politics,\(^5\) including the granting of ministries to members of supportive parties and the sudden withdrawal of ministries to meet political contingencies. National ministries, as well as the seats on national commodity boards that national ministers can control, give access to monetary resources that can be diverted to local supporters or to personal use.\(^6\) Similar behaviour occurs at the district, or Open electorate level, where MPs can use their District Support Grant funds (see Office of Rural Development, page 446) arbitrarily to gain and maintain the support of particular blocks of voters. This style of governance fails to address chronic problems that have been clearly identified by numerous investigations and also leads to the inefficient allocation of resources. Examples of these problems include the promotion of agricultural projects that will actually disadvantage village smallholders,\(^7\) and appointments to agricultural institutions of people who are incompetent.

The relationship between the national and provincial governments is governed by the *Organic Law on Provincial Government and Local-Level Government 1995*, the outcome of a reform of the *Organic Law on Provincial Governments 1977*. The Organic Law specifies which functions are held by the different levels of government. The stated aim of the 1995 reforms was to improve the delivery of services to rural areas by decentralising them to district and local government. However, the most important outcome of the reforms appears to be a dislocation of administration and service delivery at all levels of government. A 2005 review of the decentralisation process found widespread confusion over administrative and financial accountability, responsibility for service delivery, the transfer and funding of functions, the separation of capital and recurrent expenditure, and taxation powers.

Section 108 of the Organic Law provides for the National Government to enact a ‘National Planning Act’, but this has not happened, leaving PNG without a coordinated national planning system. The Organic Law does provide for coordination of planning and budgeting between national and provincial governments through the Joint Provincial Planning and Budgeting Priorities Committee and between provincial and district governments through the Joint District Planning and Budgeting Priorities Committee. These committees are widely considered to have been a bottleneck in the funding process and to be controlled by MPs, who gained considerable

\(^3\) Only one of the 109 members of PNG’s parliament is a woman, elected in 1997 and re-elected in 2002. From 1987 to 1997 there were no women members of parliament. Only three other women have been elected. No highlands woman has ever been elected to parliament. The central role of women in agriculture has largely been ignored by farmer bodies and the government institutions serving the agriculture sector. These institutions interact predominantly with men and, at the operational level, decisions about cash cropping and the sale of these products are dominated by men (see Section 6.2).

\(^4\) Party membership is unstable and political parties appear and disappear regularly between elections. Legislation was passed to prevent MPs from changing parties during the life of a parliament but it has been a difficult law to enforce. Parties and groups of MPs regularly change from government to opposition and back again.

\(^5\) ‘Pork barrel’ politics describes government spending that is intended to benefit the constituents of a politician in return for their political support, either in the form of campaign contributions or votes.

\(^6\) One outcome is a struggle between ministers and senior public servants for control of the resources of government departments. The director of the PNG Growers’ Association recently stated, ‘The bad decisions and actions by some ministers are costing Papua New Guinea too much in terms of money, time and investments. Stakeholders of the cocoa, copra and other cash crop industries are not happy with the way ministers continue to violate established procedures to suit their own interests.’ (Pacific Magazine Daily News, 14 January, 2005 <http://www.pacificmagazine.net/news/2005/01/14/png-punish-all-renegade-ministers-growers>).

\(^7\) A recent example is a proposal to build a cocoa processing factory in Lae, well away from the main cocoa growing areas, supported by a 30% levy on smallholder cocoa growers. Despite strong lobbying against the proposal by growers’ organisations, it was vigorously supported by some influential individuals and MPs.
powers under the 1995 reforms. The committees are preoccupied with spending the MPs' District Support Grants (DSGs) and not with coordinating activities between districts.\(^8\) Many MPs only spend their DSG funds on new projects and not on district recurrent service delivery costs.

Other sources of funding leave most province and district health, education, agricultural extension and infrastructure maintenance programs chronically underfunded. Estimates of costs of service delivery and funding within provinces by the National Economic and Fiscal Commission in 2006 found that Sandaun Province receives only 20% of the funds required to deliver basic services; Manus 30%; Simbu, Central and East Sepik less than 40%; Milne Bay, Oro and Gulf less than 50%; Eastern Highlands 52%; Madang and Western Highlands less than 70%; East New Britain less than 80%; West New Britain less than 90%; and Morobe, Western, Enga, Southern Highlands, New Ireland and NCD more than 100%. The cost of services was not assessed for Bougainville Province.

The *Pacific 2020* review\(^9\) of national agriculture development policies also found that major constraints affecting agricultural development in PNG have been the complex Organic Law; an ineffective extension system; the lack of an effective national agriculture development plan (see Section 6.3); the lack of transport infrastructure maintenance (see Section 6.9); ineffective communication and marketing facilities; an uncoordinated and inadequately staffed national agricultural research system; a lack of credit facilities; an acute lack of competency of staff in state institutions; and poor human resource training programs for the sector.

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**National-level agencies**

Numerous national-level government agencies have roles in agricultural and rural industries. Key factors in determining their effectiveness is whether they have the resources and institutional linkages with other agencies and all levels of government to perform their specified functions and whether they have competent directors, managers and staff. This section examines the most important organisations related to agriculture.

**Department of Agriculture and Livestock**

The functions of the national Department of Agriculture and Livestock (DAL) include providing policy advice and sector coordination relating to agriculture and livestock (including advice on the application of agricultural legislation, administered by statutory bodies); promoting agricultural development; assisting provincial governments with the provision of extension; and preparing and implementing appropriate investment programs for major commodities and livestock. (See Section 6.3 for a brief history of the Department of Agriculture.)

In the 1970s DAL lost responsibility for extension services when they became a provincial function. Export tree crops research was transferred to specialised research institutions in the mid 1980s. During the 1990s, remaining research and quarantine functions held by DAL were moved into separate institutions, and commodity boards and corporations were given greater independence. DAL’s role was narrowed to that described in the previous paragraph. However, the department struggled to adapt to its new role and wasted resources in trying to regain some of its lost functions. A 2004 review of DAL by the Asian Development Bank (ADB) found that DAL was without clear agricultural sector roles and did not have the capacity to plan or develop policy. The review argued that a National Agriculture Development Plan (NADP) ‘owned’

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\(^8\) In some provinces (for example, East Sepik, Eastern Highlands and East New Britain), MPs have pooled their DSGs to repair roads or implement province-wide programs, but this does not appear to be a common practice.

\(^9\) *Pacific 2020* was an initiative by Australia (AusAID) to foster dialogue and debate in the Pacific, PNG and East Timor on how to accelerate economic growth. *Pacific 2020* was designed to provide practical policy guidance for these countries in nine critical growth areas: the productive sectors of agriculture, fisheries, forestry, mining and petroleum, and tourism, and the growth-enabling sectors of land, private investment, political governance, and employment and labour markets. *Pacific 2020* background papers can be accessed at <http://www.ausaid.gov.au/hottopics/pacific2020/papers.cfm>.
by all the stakeholders, including rural village people, was essential if agriculture was to bring about economic and social change in PNG. But the review stated that DAL was ‘uncoordinated, was unsure of budget allocations and was poorly served by national and provincial financial information systems’, and was unable to develop or implement such a plan. DAL produced an NADP (2002–2012) which was approved in principle by the National Executive Council.

Department of National Planning and Monitoring

The Department of National Planning and Monitoring (DNPM) is responsible for national strategic development policy, development planning and preparation of the development budget, aid coordination, and monitoring and evaluation. DNPM evolved from a pre-Independence National Planning Office (NPO). DNPM was disbanded in 1985 and its tasks split between the Department of the Prime Minister and the Department of Finance. The central planning and coordination functions and dominance of development activities previously carried out by the NPO disappeared during the next ten years. In 1995 these functions were included in a new DNPM, but the department has been reorganised four times in 10 years, which has created instability and lack of continuity. Part of the reorganisations involved the provincial and district coordination branch moving from DNPM to the Office of Rural Development, which caused the DNPM to lose touch with the provinces and resulted in the poor integration of agricultural policies into national development strategies. The role of DNPM also overlaps with a number of other departments, which causes confusion and inefficiency.

The Office of Rural Development

The Office of Rural Development (ORD) has the role of supporting provinces and districts in planning, implementing, monitoring and evaluating rural improvement programs. The ORD draws on funds from the Provincial Support Grant, the District Support Grant, the Social and Rural Development Program and the Targeted Community Development Program. ORD’s role includes overseeing the allocation and spending of K1 million of provincial and district support grants per MP per year, K500,000 of which can be spent at the discretion of the provinces. Although the ORD is closer to the provinces and districts than the DNPM, it has been criticised for not collaborating sufficiently, or at all, with other government departments, the research organisations, or the universities, in the development of high quality district projects that can be supported by the MP’s grants. The 2004 ADB review argued that ‘projects submitted for funding … are not well designed, due to lack of skills in the provinces to support national members to formulate their projects’.

The funding of the districts (and provinces) is provided for under the Organic Law with decision making determined by the Joint District (and Provincial) Planning and Budgeting Priorities Committees, chaired by the MPs and comprising Local Level Government Area presidents and district managers (see page 444). Spending is widely considered to be unduly controlled by the MPs. In 2006 a new District Services Improvement Program (DSIP) was set up to complement the establishment of District Treasuries and to improve service delivery at the district level. The DSIP includes funds for ‘agriculture’. However, confusion remains over which level of government is responsible for service provision. In addition, the amount of money provided does not cover the cost of even the most basic service provision (including agricultural extension) in most provinces.

National Agricultural Council

The National Agricultural Council (NAC) was established as a committee of national and provincial agriculture ministers, supported by an advisory council of national and provincial department and division heads. After the 1995 Organic Law reforms, its role changed to one of bringing together the chairs of the provincial agricultural committees (where they exist) and the provincial agricultural advisers and statutory body heads, with the national minister and the national secretary of DAL. The secretariat is provided by DAL. The mandate of the NAC is to

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10 The District Support Grant is popularly known in PNG as ‘the slush fund’.
review national research, training and skills building in agriculture and to report on this to the secretary of DAL. The full membership is large and unwieldy and lack of funds has meant the NAC rarely meets.

**Agriculture Subcommittee of the Consultative Implementation and Monitoring Council**

The Consultative Implementation and Monitoring Council (CIMC) was established by the National Executive Council and is chaired by the Minister for Planning and Implementation. The CIMC set up a number of sectoral committees, including the Agriculture Subcommittee, made up of representatives from the private sector commodity producers, civil society (including non-government organisations), DAL, DNPM and sectoral statutory bodies. The subcommittee operates independently of the government, under the direction of the CIMC. Its role is to ensure a dialogue between government, private enterprise and civil society. The subcommittee meets reasonably regularly. The ADB review suggested that, given the dormancy of the National Agricultural Council, the CIMC Agriculture Subcommittee should oversee the National Agriculture Development Plan and the agricultural sector program planning, budgeting and implementation, and monitoring and evaluation, for at present no body takes responsibility.

**The Rural Industries Council and the PNG Growers’ Association**

The Rural Industries Council (RIC) mainly represents larger organisations and agricultural industry companies, although it is endeavouring to extend its representation more effectively, especially to growers. The chair and deputy chair come from the largest agricultural industry companies in PNG.11 The RIC has 27 members, including a number of government departments and industry boards. It has an office in Port Moresby in association with the Institute of National Affairs.

A number of growers’ associations exist in PNG, representing villagers (and in some cases largeholders) involved mainly in cash cropping. The Smallholder Coffee Growers’ Association is the largest with around 14 000 members in 14 provinces. It is supported by the Coffee Industry Corporation (CIC) (see page 450) and has four members on CIC’s board. The Palm Oil Producers’ Association (POPA), on the other hand, is an association of large oil palm producers. Oil palm smallholders are represented by the Oil Palm Industry Corporation (OPIC) (see page 451). The PNG Growers’ Association was formed out of the Planters’ Association to bring together cocoa and copra growers. These organisations come together under the Rural Industries Council, which works to raise the profile of agriculture and give a stronger voice for policies to support the sector. Some branches of the growers’ associations conduct field days and training activities.

**National Agriculture Quarantine and Inspection Authority**

The National Agriculture Quarantine and Inspection Authority (NAQIA) was created out of DAL in 1997. Its mandate is to protect the animals, plants and fish in PNG from exotic pests, diseases and weeds. It is also responsible for facilitating trade through export and import risk analysis and quality assurance systems. The head office is in Port Moresby and NAQIA operates in 15 seaports, 3 international airports and an international post office. It also maintains two animal and plant health laboratories to provide diagnostic and advisory services. Staff conduct meat inspections at five abattoirs.

The 2004 ADB report criticised NAQIA for charging high and unrealistic fees, overly restrictive rules imposed on the import of cultivars and seeds, and the slow issuing of import permits. However, the high risk that imported pests, diseases and exotic species could create severe economic damage to PNG’s agricultural production means an effective and efficient quarantine service is critical to the future of agriculture in PNG.12

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11 However, the present chair was formerly the Secretary of the Department of Primary Industry (now DAL) and was also previously the Secretary of the Prime Minister’s Department.

12 The most recent economically damaging imported pest is a cocoa pod borer possibly contained in soil that was not removed from heavy logging equipment before it was brought into PNG from Malaysia in 2005.
Fresh Produce Development Agency

The Fresh Produce Development Agency (FPDA) was established in 1989, with assistance from New Zealand Aid, to develop a competitive and sustainable fruit and vegetable industry. FPDA compiles information on prices and quantities of fruit and vegetables in the main markets, provides extension and training on production, marketing and post-harvest handling, establishes contacts between sellers and buyers, supplies certified seed potato, assists in village commercial food processing initiatives, and assists women to engage in fresh food marketing. FPDA has had an important role in the re-establishment of the potato industry following an outbreak of blight.

The 2004 ADB report suggested that FPDA needs to make greater attempts to sell its services to the industry in order to become independent of government funding. The report also recommended that FPDA make greater efforts to collaborate with the National Agricultural Research Institute and to work more with small and medium producers.

Livestock Development Corporation

The Livestock Development Corporation (LDC) is a self-financing organisation that is responsible for the control of the slaughter and processing of livestock for retail sale, for the encouragement of the smallholder sector to increase the supply of poultry and breeding-age cattle, and the production of stockfeed. LDC has abattoirs in Central, Morobe and Eastern Highlands provinces. A fruit production project and a cashew nut nucleus estate project, both in Central Province, have been established using revenue from the abattoirs and from aid money.

However, the LDC board has recently been subject to numerous political appointments and its revenue depleted by excessive board and management spending. The Goroka piggery and the cashew nut projects are in financial difficulty and the abattoirs are said to be underfunded, poorly maintained and so far below public hygiene standards that they are in danger of closing. If these facilities close, all animals for slaughter will have to be transported to Ramu Agri-Industries’ modern abattoir at Gusap in the Markham Valley. A chronic shortage of breeding-age poultry, day-old chicks and cattle for commercial smallholders exists in PNG, but LDC has seemingly been unable to respond to this need. The future of the LDC is in doubt.

Spice Industry Board

The Spice Industry Board (SIB) is responsible for regulating and collecting data on spice production and marketing, including vanilla, cardamom, pepper and turmeric. The board maintains a small office within DAL in Port Moresby. It has seven members, six of whom, including the chairman, are appointed by the Minister of DAL. SIB is poorly resourced and staff struggle to maintain basic information about production and trade. Licences to export spices are issued by the board on DAL’s advice. Poor control over quality has recently damaged PNG’s reputation as a vanilla producer (see Sections 5.14 and 5.21).

Rubber Board

A Rubber Board was established in the mid 1950s to regulate the export of rubber from PNG. The board is supposed to oversee inspections and hear appeals. It has five members, all appointed by the Minister of DAL. Considerable state investment has gone into rubber growing since the 1970s, but the schemes have been poorly managed by DAL and the Department of Lands. The privately run Doa Plantations Ltd owned by Galley Reach Holdings and the Fly River Rubber Cooperative in Western Province produce most of PNG’s rubber exports (see Section 5.11). An attempt to sell the government-owned Cape Rodney rubber factory in Central Province to private interests has been accompanied by alleged financial irregularity and a lack of transparency.

In late 2006, in an attempt to revitalise the rubber sector, an interim rubber board was formed to review the Rubber Act and to guide formation of a PNG Rubber Industry Corporation.

13 The Department of Lands was responsible for issuing land titles to the resettlement blocks. Many titles were never issued (see Section 6.7).
National Fisheries Authority

The National Fisheries Authority (NFA), established in 1998, is a non-commercial statutory authority owned by the government. The role of the NFA is to promote long-term sustainable development of PNG’s marine resources. This includes ensuring that catch levels are such that maximum sustainable yield is achieved. Other roles include protection of entire marine ecosystems, preservation of biodiversity, minimising pollution and supporting village fishers. Major fisheries are managed under a national fisheries plan and local fisheries are also controlled nationally. The NFA trains staff in the National Fisheries College at Kavieng, New Ireland Province. A major review and restructure in 2000 and 2001 created an efficient and effective body, but recent political appointments to the board and management have been quickly followed by allegations of excessive licensing and other forms of malpractice.

PNG Forest Authority

The Papua New Guinea Forest Authority (PNGFA) was formed in 1993 as a statutory corporation to manage the national forest sector. Because forestry has been declared an area of national interest, control over forests has not been decentralised to the provinces under the 1995 Organic Law reforms. PNGFA comprises the National Forestry Board (NFB) and the National Forest Service (NFS). The NFB is made up of representatives of a number of government departments, provincial governments, women, forest owners, the forest industry and NGOs. The NFS works in all provinces.

PNG forestry policies and practices have been the focus of controversy, argument and allegations of corruption for some time (see Section 5.8). The most important issues are resource acquisition, allocation of licences to logging operators who do not comply with key requirements (like sustainable harvesting), poor monitoring of harvests, exports and enforcement of requirements, and the identification of landowners and lack of concern for their best interests. Aid donors, especially the World Bank, have attempted to place conditions on programs to force the PNG Government to comply with logging laws and control the damage being done to PNG’s forest resources. Uncontrolled logging is leading to losses by forest-owning villagers and the national economy.

National agricultural plans

A failure to produce realistic national agricultural plans that deliver economic returns to PNG has contributed to the gradual marginalising of agriculture in national strategic plans (see Section 6.3). This has been accompanied by a reduction of public and aid donor resources to agriculture. This trend is reflected in the Medium Term Development Strategies (MTDSs) produced since 1990. The 1990–1994 MTDS emphasised the importance of agriculture as a driver of economic growth and rural development. It gave rise to a number of projects within DAL around the themes of ‘strengthening extension, improved coordination between national and provincial government agriculture departments, encouraging private sector development, self-sufficiency in food production, environmental protection, opportunities for women and youth and efficient use of scarce resources’. In the 1997–2002 plan, the emphasis had shifted to ‘planning and fiscal discipline’ and in the 2003–2007 plan to ‘good governance; export-driven economic growth; and rural development, poverty reduction and empowerment through human resource development’. In the 2005–2010 plan agriculture was not an expenditure priority and, in a speech on economic growth in May 2006, the Minister for Treasury mentioned agriculture only once, in the same sentence as tourism. The failure of agriculture to maintain prominence in plans for national economic development reflects a lack of capacity in DAL to devise sensible plans, a lack of ability by various institutions to implement plans (particularly after the confusion caused by the 1995 Organic Law reforms), the unrealistic and contradictory nature of many of the proposals put forward, and frustration in other parts of government and among aid donors at the seeming failure of the agriculture sector to deliver economic growth.

14 The 2005–2010 MTDS identifies priority areas for development. They are transport infrastructure, promotion of income-earning opportunities, education, health, and law and justice.
Agricultural research organisations and commodity boards

The International Food Policy Research Institute argues that every dollar invested in effective agricultural research results in a $6 increase in agricultural output and a $15 increase in economic growth. Effective agricultural research is vital to improve food security and cash income for rural Papua New Guineans. In the 1990s, the DAL research division was split into separate institutions and the commodity boards given greater powers (see page 445). Almost all agricultural research in PNG is now conducted by several statutory research organisations.15 The most important are:

- National Agricultural Research Institute (NARI).
- Coffee Industry Corporation (CIC).
- Cocoa Coconut Institute of Papua New Guinea (CCI).
- Papua New Guinea Oil Palm Research Association (OPRA).

National Agricultural Research Institute

The National Agricultural Research Institute (NARI) was formed from the research division of DAL in 1997. It is a publicly funded, statutory research organisation that conducts applied and development-oriented research on food crops, emerging food crops, emerging cash crops, livestock, and resource management issues. The major targets are the smallholder, semi-subsistence, semi-commercial and commercial farmers. NARI manages six research stations: Keravat (East New Britain Province), Bubia and Labu (Morobe Province), Aiyura (Eastern Highlands Province), Laloki (Central Province) and Tambul (Western Highlands Province). Additionally, NARI owns the National Chemistry Laboratory and National Agricultural Insect Collection in Port Moresby, and has an office in Mount Hagen. NARI headquarters is at Bubia near Lae.

NARI has been well managed. It has had difficulty training and retaining high quality staff. Because NARI does not have access to funding from a levy on exports as do the export commodity-based research institutions, funding for capital equipment and maintenance are proportionately less than in other agencies. Aid projects, in particular the Australian Contribution to a National Agricultural Research System, have supported NARI for some years, but long-term sources need to be found to maintain an adequate income.16

Coffee Industry Corporation

Before 1991, coffee growing and exporting was governed by the Coffee Industry Board based at Goroka. Research on coffee was conducted by the Coffee Research Institute (set up in 1986) at Aiyura and extension to growers was the responsibility of the Coffee Development Agency. This last body was created after coffee rust appeared in PNG in 1986. In August 1991, the three organisations merged into the largely self-financing Coffee Industry Corporation Ltd (CIC).

The CIC has a broad range of powers, including buying and selling coffee, setting prices, registering and controlling exports, setting quality standards and controlling credit worthiness and capacity of market participants. CIC is unusual in that it is established under the Companies Act, but has been granted

15 Three private companies are also involved in agricultural research: Ramu Agri-Industries Ltd, New Britain Palm Oil Ltd and Trukai Industries Ltd. They conduct research on sugar cane, oil palm and rice production respectively. Other research is conducted at the University of Technology in Lae (Agriculture and Forestry departments) and University of Vudal in East New Britain Province. One non-government organisation, World Vision PNG, is involved in sweet potato research. The Republic of China (Taiwan) Technical Mission conducts research on introduced vegetables and rice. This group is based at Bubia near the NARI head office, but operates independently of PNG institutions and produces few technical reports. Some research on wheat and other crops was conducted by an agricultural mission from China near Kandep in Enga Province in the late 1990s.

16 In 1999 the Skate Government cut all funding to research organisations in PNG and suggested they should be abolished. NARI survived because of careful financial management and international assistance. Government funding has since been reinstated, but the danger remains that it can be arbitrarily cut again.
specific regulatory functions and powers by parliament. In practice, the CIC only applies its regulatory functions to setting guidelines, implementing firm quality control, and approving export contracts (and contract prices). The marketing of coffee is left in the hands of private companies licensed by the corporation. There is a risk that the board could become involved in the international marketing of coffee, and it has the power to do so, but the only occasion when the former Coffee Industry Board used this power (in the early 1980s), it failed badly. That experience provides a strong deterrent to using the powers again. CIC now has two divisions: the Research & Grower Services Division (made up of the Coffee Research Institute and Extension Services Division) and the Industry Operations Division. The CIC is well resourced (from an 8 toea/kg levy on green coffee beans).

Problems facing the CIC are how to:

- Improve the quality of village coffee and increase overall production.
- Ensure board members are competent, represent industry interests and have a good knowledge of the coffee industry.
- Handle increasing attempts at political interference in its powers and functions.

**Cocoa and coconut institutions**

The Cocoa Coconut Institute of Papua New Guinea (CCI) was formed in 2003 from the merger of the PNG Cocoa and Coconut Research Institute and PNG Cocoa and Coconut Extension Agency. CCI is owned jointly by two statutory bodies, the Cocoa Board of Papua New Guinea and Kokonas Industri Koporesen (KIK), which fund the institute through levies on exports.

The Cocoa Board is responsible for the inspection of all export cocoa. It is funded by a K40/tonne levy on exported cocoa, some of which goes to supporting CCI. The board licenses around 5500 cocoa fermentaries and 14 cocoa exporters. Price competition at all stages of the marketing chain has kept marketing margins low, to the benefit of growers. However, the board has suffered from ‘irregularities’ in management in recent years.

The CCI is responsible for all cocoa and coconut research, development and extension in PNG. CCI has two active research stations, one at Tavilo in East New Britain Province and the other, the Stewart Research Station, in Madang Province. At a third research station, in Bougainville Province, operations are temporarily suspended. CCI owns 3234 ha of cocoa in eight plantations and two hybrid seed gardens. The plantations and seed gardens generate a significant proportion of CCI income.

The Kokonas Industri Koporesen, based in Port Moresby, evolved out of the privatisation of the Copra Marketing Board trading functions in 2002. KIK’s role is to contribute to policy and regulate the copra and coconut industry. Marketing is undertaken by the private sector, where an increasing proportion of exports is in the form of coconut oil, particularly from the Toboi mill in Rabaul. KIK provides some financial support for coconut research as well as funds for seed gardens. Growers feel strongly that KIK provides few benefits (see Section 5.21), while imposing high costs in the form of levies on producers. The 2004 ADB report stated that it is ‘difficult to justify the existence of KIK’ and recommended that it be abolished.

KIK’s former coconut mill in Madang, set up in the 1990s at exorbitant cost and managed by subsidiary company PNG Coconut Commodities (PNGCC), was sold to a New Zealand company exploring biofuels.

**Oil palm organisations**

The oil palm industry is governed by a number of organisations: the Oil Palm Industry Corporation (OPIC), Papua New Guinea Oil Palm Research Association (OPRA), the Oil Palm Growers’ Association (OPGA), and the Papua New Guinea Palm Oil Producers’ Association (POPA).

OPIC was established in 1992, as part of a reform of the oil palm industry in response to grower frustration over low prices, a then unsatisfactory pricing

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17 Levies imposed by KIK were reduced in September 2006. The levy on copra was cut from K45 to K34 per tonne; that on copra oil from K60 to K44 per tonne; while the levy on coconut meal of K10 per tonne remained unchanged.
formula and declining government services. OPIC is funded by a levy on sales of fruit, matched by the oil palm companies. International aid funding has also provided significant financial support to the corporation. Funding is expected to continue under a proposed World Bank smallholder agriculture project. OPIC’s main role is to provide extension services to smallholders in order to increase productivity, promote improved management, and enhance the wellbeing of producers. OPIC also liaises with government, the oil palm companies and other organisations involved in the industry. OPIC has five local planning committees, comprising representatives of smallholders, companies and the government, in five project areas.

OPRA is a non-profit research organisation with its headquarters at Dami Oil Palm Research Station in West New Britain Province, and another facility at Popondetta in Oro Province. OPRA was established by pooling research facilities of three companies to bring together government, plantation companies and smallholders under a single research organisation. OPRA’s main areas of research include agronomy, entomology, smallholder studies, and plant pathology. OPRA is funded by a levy on production (50 toea/tonne of fresh fruit bunch for smallholders and 80 toea/tonne of fresh fruit bunch for plantations), government funding and research grants. OPRA also provides technical support and training to smallholders, extension officers and plantation company officers. OPRA’s research is highly regarded internationally.

POPA represents the joint interests of the milling companies. Each project area also has a growers’ association which represents the interests of smallholders to the companies, OPIC, OPRA, and national and provincial governments. The chair of each oil palm growers’ association sits on the board of OPIC. The extent of smallholder involvement in the associations varies between project areas and over time. At various times the associations have experienced problems with financial mismanagement resulting in members losing confidence in their organisations. For example, in 2000 the Hoskins growers’ association suffered a significant loss of members after the association’s funds were misappropriated. In Popondetta the association membership has been limited because the settlers believe that the organisation is dominated by local landowner interests. The distribution of financial benefits between the milling companies and the smallholders has been significantly adjusted in favour of smallholders in successive reviews in the 1990s and in 2000. However, smallholder advocates argue that the mills (or ‘nucleus estates’) have economic advantages over smallholders and the pricing formula fails to properly value customary land as well as heavily discounting smallholder labour.

Agricultural extension services

Before the establishment of provincial governments, agricultural extension services were conducted by DAL. In the late 1970s, responsibility moved to Divisions of Primary Industry within provincial departments. This arrangement ceased in 1995 when provincial governments were reformed. Agricultural extension staff now report to district managers at the district level. The outcome is that national staff are isolated from provincial extension services and province staff are isolated from district-level staff. Confused lines of authority, reporting and responsibility exist for extension staff. Consequently, most government agricultural extension services barely function and staff morale is severely degraded. This is exacerbated by confusion over financial responsibility and long delays in funds reaching districts. Regulations that specify responsibilities for funding and reporting on particular functions have never been implemented, and responsibilities remain confused and chaotic. Many district administrations are still ignorant of efforts to improve funding through the District Services Improvement Program (see page 446). Most government provincial radio stations, which once provided remote rural people with information, are no longer operating. Where radio stations are working, they are forced to charge fees for presenting programs because they receive inadequate funding.

18 Higaturu Oil Palms Ltd, New Britain Palm Oil Ltd and Hargy Oil Palms Ltd.
Some extension is conducted by some of the organisations described above, including Fresh Produce Development Agency, National Agricultural Research Institute, Coffee Industry Corporation, Cocoa Coconut Institute and Oil Palm Industry Corporation. The University of Vudal is involved in agricultural extension in the Islands Region. Some extension is also provided by organisations affiliated with churches. Numerous locally based NGOs have some involvement in agricultural extension, but most are under-resourced and have limited technical capacity. The lack of a national coordinating NGO body means duplication and competition in relationships with government and funding agencies.

More extension effort is directed at rice production than for any other commodity. Staff of a number of NGOs, provincial Divisions of Primary Industry, Trukai Industries Ltd, and the Republic of China (Taiwan) Technical Mission are involved in promoting rice production. Despite these inputs and the handout of free equipment, seed and fertiliser, domestic rice production is negligible compared with that of the staple food crops (see Sections 2.2 and 2.5).

The ADB review in 2004 found that public sector extension services lacked direction, were very high cost and low benefit, and that the main research organisations did not have effective extension arms and failed to coordinate their efforts if they did extension at all. The review also found that linkages between research, new technology and extension needed to be greatly improved, communications in rural areas were extremely poor and needed urgent improvement, school curriculums did not emphasise agriculture, and the quality of most vocational training was poor.

Overall, agricultural extension and outreach is limited. With some exceptions, extension activity takes place near research stations, urban areas and main roads. Most rural villagers have little or no access to information about improved production and marketing of agricultural produce. A large unsatisfied demand for information exists on many aspects of food, cash crop and animal production and marketing, as well as for face-to-face contact with extension agents.

**Summary**

Governance in the agricultural sector of PNG occurs at national, provincial, district and local levels and also by organisations devoted to particular crops and commodities. Other sectors, for example health, education and transport, influence agricultural development. However, lack of coordination, widespread confusion and ignorance of laws and regulations that govern responsibilities for service delivery, funding and reporting cripple attempts to make agriculture a primary driver of national economic and local rural development. The chaos results partly from the provisions of the 1995 reforms to the Organic Law and partly from the instability of political parties. The 1995 reforms have introduced confusion about relationships and responsibilities between national, provincial, district and local level governments. Within political parties, positions on the boards of bodies that govern and promote agriculture are used as rewards to supporters, who may not be competent or who may not act in the best interests of rural smallholders. This situation occurs in other sectors that are critical to agriculture: infrastructure, transport, education and health, such that agricultural development is subject to multiple constraints.

The majority of rural dwellers produce their own food and house themselves, so their basic livelihoods are insulated from the chaos in the world beyond their villages. They also produce most of the

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19 Lutheran Development Service is responsible for Yangpela Didiman, a self-help movement carrying out agricultural extension, using around 30 paid staff and up to 3700 volunteer ‘farmer motivators’, usually young men and women who have taken a 12-month training course. The Salvation Army provides services to remote villages in Eastern Highlands Province with support from AusAID’s Incentive Fund, international NGOs, the Swiss Government and the United States Peace Corps. The Baptist Church has a small operation in Mount Hagen focused on promoting rabbits for meat in remote villages. CARITAS, the Catholic community development organisation, supports rural development initiatives in a number of provinces. The Anglican Church does similar work in Milne Bay and Oro provinces. The Seventh-Day Adventist Church has promoted vegetable marketing in Eastern Highlands and Bougainville provinces.
agricultural commodities exported from PNG, often despite significant disincentives from government policies and practices, and lack of services. On the basis of the past two decades, it seems unlikely agriculture will become the driver of economic growth that it could be, until at least some of these constraints of poor governance are removed.

Sources


Papua New Guinea’s national strategic goals include economic growth and poverty alleviation in rural areas. In PNG, where over 80% of people live in rural areas, grow most of their own food and earn foreign earnings by growing cash crops, agricultural development will be a critical part of achieving these goals.

Agricultural development will depend on an effective, rational, planning process. Planning has at least two parts: the first is knowing, as realistically as possible, the present circumstances; the second part involves the development of a set of rational steps that will allow progress from the present circumstances to a desired position, at a given future time. Both parts of the planning process require up-to-date, accurate information about agriculture.

Knowledge about agriculture in PNG comes from three main sources:

- The national census, which every ten years collects information on the number of people in PNG as well as some other critical attributes of all of the population.

- Administrative or points-of-service information. This is information from the places where services are delivered. These provide information on the number of people serviced and their needs, and the types of facilities and the staff offering the services.

- Surveys that are conducted to collect information on particular aspects of agriculture.

This section is mainly concerned with surveys, and only briefly examines census and administrative information.

### Surveys of smallholder agriculture

A relatively large number of surveys of various aspects of smallholder agriculture have been undertaken in PNG. Here they are reviewed briefly. The PNG Resource Information System (PNGRIS) and the Mapping Agricultural Systems of PNG Project (MASP) are described in greater detail in Section 1.15. Both are very important sources of national-level information for rural development. Most of the information in PNGRIS and MASP is still relevant for development, either because it does not become dated (for example, data on the physical environment) or because it was recorded not long ago (for example, the MASP data).


The 1961–1962 Survey of Indigenous Agriculture was a national sample survey of 100 villages carried out by the Bureau of Statistics, the Department of Agriculture, Stock and Fisheries (DASF) and the Australian Bureau of Statistics. The sample frame was the annual village censuses carried out by Department of Native Affairs patrol officers, stratified by estimates of staple food, population size, population growth and agricultural environment.
The total sample included approximately 0.1% of the total population. Sample villages were visited three times at six-month intervals. An ancillary survey of coconuts was also undertaken.

Only basic summary statistics are available from this survey. Even these must be used with caution because of the large variation in the data. Nevertheless, this survey provided important baseline information. The original field datasheets from this survey appear to have been lost.

**Department of Agriculture and Livestock surveys**

Since the early 1960s, the Rural Statistics Section of the Department of Agriculture and Livestock (DAL) has produced statistics on the major cash crops grown in PNG. In the 1960s, these figures were based on regular annual counts that all agricultural field officers were supposed to carry out, and from regular sample surveys. In the 1970s the annual tree censuses were discontinued because it became obvious that it was impossible for all of the trees represented by the census totals to be counted properly every year in the time available.\(^1\) As a replacement for the annual tree counts, from around 1975, the national department began arranging sample surveys in every province. The surveys involved counting all trees by age and condition. Planting density was estimated using a triangle and the total areas planted calculated. Food crops were listed but not counted. Observations of field enumeration suggest that trees were not actually counted, but growers were just asked to estimate how many trees they owned. This method of counting trees in PNG villages produces very unreliable data.

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\(^1\) In the Maprik District in the 1970s, the figures in DASF files appeared to have been arrived at by multiplying the previous year's figures by 5%. However, some field surveys were conducted. In 1972 in one village where a DASF survey was observed, the Australian agricultural field officer asked all coffee growers to go to their gardens and pick one leaf off every tree. While the officer waited in the village, the villagers all went to the coffee garden nearest the village and picked handfuls of leaves from there. The officer then duly counted the leaves picked and entered the figures into the census forms.

**Sample survey of smallholder coffee producers 1975**

In 1973 a national sample survey of coffee smallholdings was carried out by the Rural Economics and Commodity Marketing Branch of DASF. A detailed report was produced following the 1973 survey. The survey was conducted because it was recognised that the annual censuses of tree crops conducted by DASF field officers (see above) were inaccurate. The sample frame was the list of villages censused every year by patrol officers, selected in proportion to the estimated tree numbers, population numbers and names on the 1972 electoral roll. In the selected villages five growers were selected at random from the electoral roll. The survey was carried out by six special teams, under close supervision.

The survey produced useful results, but was reported to have been unsuccessful in two provinces (Simbu and Western Highlands), where, compared to existing tree counts and production figures, a ‘gross underestimate’ of trees appeared to have occurred.

**Economic survey of smallholder coffee producers 1976**

In 1976 the Department of Primary Industry (DPI) contracted an ex-DPI officer (D. Anderson) to carry out another survey of smallholder coffee growers in the most important highlands coffee-producing provinces (Western Highlands, Simbu and Eastern Highlands). The survey was designed to complement the 1975 survey in the provinces where it had been unsuccessful. Thirteen villages were selected from each province on the basis of distance from a main centre, road access, the length of time coffee had been grown at the village and land availability. Agricultural students from the villages surveyed were used as enumerators. Trees were counted and selected growers interviewed about coffee stocks, costs of production and labour. Coffee-producing work was observed. The data from this survey are considered to be of high quality and a comprehensive report on methods and results was completed.

**Coffee farming systems survey 1980**

In 1980 a survey was conducted by the DPI Rural Statistics Section of coffee growing in Western Highlands and Simbu provinces. It was to be a 5-year
follow-up to the 1975 and 1976 surveys. A sample was drawn from all villages censused, proportional to size. The enumerators were university students from the provinces being surveyed.

This survey was unsuccessful because the enumerators were not supervised in the field. The tree counts were significantly different from those of the 1975 and 1976 surveys. An assessment of what happened revealed that many enumerators did not visit the coffee gardens of the households they were allocated, but asked the growers to estimate tree numbers. They also had difficulty with the many qualitative judgments that the questionnaire required them to make.

Coffee farming systems research project
The coffee farming systems research project began in 1981. It used a number of innovative approaches to data collection at the village level. Two villages in the Asaro Valley of Eastern Highlands Province were studied intensively. Coffee trees were counted, air photographs were used to map land use, a soil survey was carried out and the coffee gardens examined by a coffee agronomist. Data on production, yields and income were collected by having literate youths from the villages monitor roadside sales and prices. The reporters also kept daily diaries of coffee producing and other village activities. The reporters were visited every two weeks, when they were paid, their data checked and new forms issued. During the first year of the project data quality was good, but during the second year, the project supervisor was posted elsewhere and data quality quickly became poor when the village reporters were not contacted for long periods of time.

Food crop market surveys
Numerous surveys of fresh food markets have been conducted in PNG over the past 55 years (see Section 5.3). The purpose of the survey and type of information collected varies, but the quantity and value of food sold was usually recorded. Information on surveys conducted between 1951 and 1982 is summarised in a review by Bourke (1986). His paper includes details of methods and the value and quantity of produce sold in Koki (Port Moresby); Aiyura, Goroka, Kainantu and Ukarumpa (Eastern Highlands); Kokopo, Rabaul and Vunapope (East New Britain); Kerema (Gulf); Lae (Morobe); Popondetta (Oro); Koge, Kavugara, Kimbe, Marakewa, Mosa and Talasea (West New Britain); and Mount Hagen (Western Highlands). In 1988 the Rural Statistics Section of DAL carried out surveys in food markets in Alotau, Port Moresby (Koki), Lae, Madang, Mount Hagen and Rabaul. The results were published between 1988 and 1992.

An important source of information on prices of fresh food over a long period is an ongoing survey of prices of 15 fresh foods conducted weekly in five urban markets (Port Moresby, Goroka, Lae, Madang and Rabaul). These surveys commenced in 1971 with recording done by local DPI staff. The data are used to generate the consumer price index (see Sections 4.2 and 4.3). The data are not published, but are available from the National Statistical Office (NSO) in Port Moresby. Staff of the Fresh Produce Development Agency (FPDA) record prices of about 50 fruit and vegetables in selected urban food markets and stores. Surveys are undertaken in Port Moresby, Lae, Madang, Goroka, Mount Hagen, Kokopo and Popondetta. Data are available from the FPDA in Goroka.

Rapid rural appraisal
A series of rapid rural appraisals (RRAs) were conducted in various locations between 1978 and the late 1990s. An RRA is a survey that is conducted by a number of experts who collaborate to study a well-defined problem from different viewpoints. The various disciplines they bring to the study may include, for example, land use mapping, human nutrition, tree crop agronomy and social systems. The term PRA (participatory rural appraisal) has tended to replace the term RRA in recent years, although the techniques usually differ little in practice.

In 1978 an RRA was conducted on the Nembi Plateau in Southern Highlands Province where high levels of child malnutrition had been identified. Other RRAs were subsequently done in the following areas: Amanab (Sandaun), Bougainville Province, Bubia (Morobe), Gazelle Peninsula (East New Britain), Gumine (Simbu), Jimi Valley (Western Highlands), Kanabea (Gulf), Okapa area (Eastern Highlands), Rabaraba (Milne Bay), upper Ramu Valley (Madang) and Wosera (East Sepik). A number of these RRAs were conducted in the early stages
of the large rural development projects described in Section 6.8. Reports from most of these surveys were lodged in the DAL library in Port Moresby. The quality of the information is uneven, but the reports contain much useful information about certain locations and are a valuable resource.

**Designing monitoring systems for smallholder agriculture in PNG 1988–1991**

Between 1988 and 1991, the Department of Human Geography at The Australian National University (ANU) and the PNG Department of Agriculture and Livestock, funded by the Australian Centre for International Agricultural Research, produced 20 reports on methods of data collection on smallholder cocoa and coffee production in the highlands, the Gazelle Peninsula and East Sepik Province. The reports are available from the authors of this book at the ANU.

**Other surveys**

There have been many other surveys of smallholder agriculture over the past 60 years. The list below is a small sample to indicate the range of surveys conducted.

- In 1947, a survey of village agriculture in Manus Province (Conroy).
- In 1947, a survey of village agriculture at seven sites as part of the PNG nutrition survey expedition (Conroy and Bridgland) (see Section 6.6).
- In 1961, surveys of ‘intensive agriculture’ at Maprik (East Sepik Province), Enga Province and Simbu Province. These surveys produced more detailed reports than that from the 1962–1963 national agricultural census for these areas.
- In 1974, an economic survey of cocoa growing in PNG (Godyn).
- A survey of smallholder cocoa in Bougainville Province in 1976 (Coulter).
- In 1975, a survey of food production on Hoskins (West New Britain Province) oil palm blocks (and subsequent surveys) (Benjamin).
- A survey of yam growing in Central Province in 1986 (King).
- In 1991, a survey of farm management by coffee smallholders in Western Highlands and Southern Highlands provinces.
- In 1992, a survey of smallholder agriculture on the Gazelle Peninsula (Levett).
- Surveys on farming systems by DAL from 1993 (Woruba and Humphrey).

**Censuses and administrative data**

**PNG National Census**

The PNG National Census has been conducted approximately every ten years since 1971. Previous censuses in PNG have been conducted in 1966, 1971, 1980, 1990 and 2000 (see Section 1.1). The national census is a critical source of information for agricultural planning. In 2000, census units (CUs), were geo-located and their locations recorded as latitudes and longitudes, which enables them to be mapped on digital maps by geographical information systems software (see Section 1.15). The ability to map CUs and display information about them on computerised maps is a very powerful analytical and planning tool.

The National Statistical Office sells census data and digital maps at the census unit and household level. As well as collecting population counts, the census asks questions of all households included in the census (around one million households were counted in the 2000 Census). The questions included:

2 Rural people in PNG live in a range of settlement types, which include scattered homesteads, hamlets and villages. Census units are often villages, or parts of villages, but they are sometimes just geographical points where, in colonial times, people were required to assemble to be censused. In the 2000 National Census, the average number of people censused at a census unit was 232.

3 There are a number of problems with the geo-located census units in the 2000 census. Most important is that around 40% of CUs in the 2000 census cannot be identified in the 1990 census. A similar problem exists between the 1980 and the 1990 censuses. Changes also occurred in higher-level units. Census Divisions were replaced with Local Level Government Areas, and district boundaries changed.
A question on ‘agricultural activity’, which was defined as involvement in growing or raising any of the following either for cash or own use: cocoa, coffee, rubber, oil palm, coconut, betel nut, livestock (cattle, pigs, goats, sheep), poultry, food crops/vegetables/root crops, fish (including crabs and seashells), or any other major crop or livestock.

A question on ‘economic activity’, which was defined as receiving money from or involvement in any of the following: selling food crops/cooked food at a market/roadside, selling fish (including crabs and seashells), selling meat at a market/roadside, selling manufactured items (such as carvings, bilums, mats), selling betel nut/mustard, running a Public Motor Vehicle, hiring boats, running a trade store, or any other major income-generating activity.

The national census, acknowledging problems with some of the data, remains a critical resource for agricultural and rural development planning. It provides standards for data collection, definitions, codes and identification of places (CUs). It also provides a national frame for sample surveys and the denominator in the calculation of rates that allows comparisons between different parts of the country.

**Provincial Data System**

The Provincial Data System (PDS) was set up in the 1970s by the then National Planning Office and Department of Decentralisation, to replace village registers and the Area Studies reports that had been written regularly by Australian patrol officers. The original PDS was compiled by hand; data were collected at the village level and entered into village registers. Summaries were passed up the administrative hierarchy and were combined into larger administrative units. There were problems with data aggregation resulting from misunderstandings of definitions and clerical errors during data entry. Disaggregated data was not available at levels above that at which it had been collected.

In 1978 the Bureau of Statistics attempted to computerise the PDS. By 1981 Rural Community Registers were published which showed all the CUs in a Census Division with their resident populations, absentee populations and services available to them. By 1983 Services Access Tables were prepared showing what services were accessible from CUs. A well-organised and presented PDS, using computer mapping methods, has the potential to be a critical planning tool.

Prior to the 1980 census, the PDS population registers were updated using the Department of District Administration patrol officers as enumerators. The patrol officers believed they should be conducting the national census, rather than the NSO census enumerators, and it is said they carried out a very good quality nationwide rural village census to show what they were capable of. The results were stored on a computer in the National Statistical Office. The present location of the data is not known.

**Administrative data**

The knowledge of where services are located, their capacity to provide a service and the numbers of people who access the service is fundamental to the effective administration of any bureaucracy. Information about health, education, transport and agricultural service provision should be available annually from the particular government departments providing the services. In PNG the production of information about service provision has become fragmented and dysfunctional in recent decades. Confusion over responsibilities, jealousies and competition between national departments

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4 For example, the national Department of Education does not have a list of all schools in PNG. Two lists of schools, one collected from the department and the other from the NSO in 2004, have only a 45% overlap. The national Department of Health has produced province and district health profiles, including digital maps of health service facilities, as part of its national health plan, but the digital data have not been made available to any departments outside health, including the departments responsible for national planning. The Department of Provincial and Local Government Affairs refused access to everyone outside the department to its district database. When food shortages occurred in 1997 and an attempt was made to use that database, it was found to have a whole province missing and to contain other errors that made it worthless. For many years the Department of Agriculture and Livestock refused to make the PNG Resource Information System (PNGRIS) available to other potential users (see Section 1.15).
and national and provincial administrations means that reliable information is not freely available for planners or analysts outside the department concerned.

**Other relevant non-agricultural surveys**

**Rural household survey**

In 1985 an attempt was made to carry out a rural household survey (RHS). The sample was drawn from the 1980 CUs. The RHS was to survey the populations of all households in a selected CU and to use this information to select households for a two-week long intensive survey of income and expenditure. The final survey had three forms: the *Household Form*, which collected information on dwellings, ownership of assets, and household composition; the *Census Unit Form*, which collected information on health and education facilities, drinking water supply, transport and communication facilities, commercial, agricultural and administrative activities, local assets, seasonal characteristics of the CU, land quality, land use, and trade store and commodity prices; and the *Household Census Form*, which collected demographic and occupational information of residents and visitors in each household in the CU. A household diary was used to record stocks at the beginning and end of the intensive survey period.

Two trial surveys were carried out in Milne Bay Province and at Cape Rodney in Central Province. The Milne Bay trial demonstrated that too much was being asked of the survey enumerators, especially the food garden surveys, which were difficult to carry out and were poorly done. The second trial, with a reduced number of questions, was said to be successful, but planning for the national census in 1990 overtook the implementation of a national RHS.

A successful urban household survey was completed between 1985 and 1987. Data from this survey have been used, for example, to examine the demand for fresh food that is produced in rural areas and sold in urban markets in PNG towns.

The World Bank funded a sample household income and expenditure survey in 1996 as part of a poverty assessment (the PNG Household Survey). The methods used in this survey are described in more detail in Section 6.10 on rural poverty, and in other publications.

**Demographic and Health Survey**

The Demographic and Health Survey (DHS) was carried out between 1993 and 1998. It contains information that is indirectly related to agriculture. The survey was a sample survey designed to provide reliable national-level information on fertility, infant mortality, child mortality, contraception and maternal and child health indicators. At the provincial level, the survey was designed to provide information on fertility, mortality, education, employment and housing.

The 1996 DHS was conducted in two phases. The first phase was a survey of 1250 households using the 1990 CUs as the sampling frame. The second phase was a survey of women aged 15–49 years in 250 households selected from the first phase sample. A report published in 1997 contains information on characteristics of the households, fertility, family planning, marriage, polygamy, infant mortality, child mortality, maternal and child health care, infant feeding practices and HIV/AIDS knowledge and behaviour. A second DHS was planned for 2006.

**Summary**

Much information can be derived from previous rural surveys in PNG. Due to the uneven quality of data sets, some are of historical and baseline value only. Others have useful data that is still relevant for planning today.

The problems that occurred in many of the past surveys act as a reminder that conducting rural surveys in PNG is not easy. A great deal of thought must be put into the primary objectives of the survey and the questions to be used that will achieve these objectives. Common sense must be used when devising the questions: can they be understood in Tok Pisin or Motu; do people really have the...
information that is being sought; can the responses be related to previous surveys so that changes over time can be analysed? Questionnaires must be tested before a larger survey is done and, perhaps most importantly, surveys will almost certainly fail unless the enumerators are closely supervised in the field and the tasks they are assigned are within their capabilities. Time and funds must be allocated for entering, cleaning, compiling and analysing data. Assistance with statistical methods must be sought from well-qualified experts. If all these details are not given sufficient rigour, wrong conclusions can be drawn, or the original effort and money used to do the fieldwork wasted.

**Sources**


DAL (Department of Agriculture and Livestock) (1992). Report on food crop market survey 1988: Rabaul market. Rural Statistics Section, Policy Programming and Budgeting Division, Department of Agriculture and Livestock, Port Moresby. (Published reports are also available for five other markets surveyed).


6.6 Nutrition surveys

The adequate nutrition of children in PNG is closely associated with the food production systems (or agriculture) where they live. Three surveys of the nutritional status of Papua New Guineans have been carried out: in 1947, in 1982–1983 and in 2005. The first and third surveys covered adults and children, while the second covered only children five years of age and under.

1947 New Guinea Nutrition Survey

The 1947 survey was carried out by staff from the Australian Department of Health and officers from the Department of Education and the Department of Agriculture, Stock and Fisheries of the provisional Papua and New Guinea administrations. The field party included a medical doctor, a parasitologist, a nutritionist, two biochemists, an agriculturalist, a sociologist, a dentist and a photographer. An intensive survey was carried out in five villages selected on the basis of their staple foods, ease of access and the absence of any major, sudden changes to the village economy. The villages surveyed were Busama (where the staple food was taro), on the coast 30 km south of Lae; Kaiapit (banana) in the Markham Valley 100 km west of Lae; Patep No. 2 (sweet potato and taro) in the Wampit Valley near the Lae-Wau road around 80 km from Lae; Kavitaria (yam) in the Trobriand Islands of Milne Bay; and Koravaki (sago) in the Purari River delta in Gulf Province.

The survey found that, in general, PNG village diets were adequate, but they were often badly balanced, with too many calories coming from carbohydrate and not enough from fat and protein. Protein levels were ‘markedly inadequate’. Starchy vegetables (root crops and banana) comprised 86% by weight of diets, with meat and fish only 0.6%. Greens contributed 5.3%, fruit and vegetables 4.5%, and cereals and legumes 3.9%. The intake of fat was notably low. Mineral and vitamin intakes were probably adequate. The lack of protein was especially concerning in children. However, few signs of clinical malnutrition were observed in adults, although children weighed less for their age than was satisfactory.

Recommendations included improved agriculture, although the survey found agricultural systems that produced food in such difficult environments were to be admired. Increased variety in food plants, including cereals and legumes (rice, millet, sorghum, peas, beans and peanuts), and increased use of animals for milk and meat, and fish, was recommended.


The National Nutrition Survey (NNS) of 1982–1983 measured the weight and length of a sample of approximately 30 000 children, selected from all

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1 These figures add up to 100.3%. The error is in the source (Hipsley and Clements 1950:23).
districts and environments in PNG. It was conducted by provincial nutritionists in the Department of Health and the PNG Institute of Medical Research. Rather than comparing PNG children against international standards, the NNS compared them against mean PNG growth curves for three altitude classes (below 600 m, 600–1200 m and above 1200 m). The results are expressed in terms of the number of standard deviations that the weight and length of sample children, aged 18 months and 30 months, fell above or below the altitude mean (see Box 6.6).

The distribution by district of the estimated proportion (per cent) of children who were below the PNG standards for length-for-age (stunted) and weight-for-length (wasted) in 1982–1983 is shown in Figures 6.6.1 and 6.6.2, respectively. Highlands children were shorter and heavier than lowlands children. Children in the 600–1200 m altitude class were lighter than lowlands children and shorter than highlands children. These differences were found to be the outcome of differences in nutrient intake, birthweight and sickness, with all these factors being heavily influenced by environment.

A re-analysis in 1999 of NNS data from almost 16 000 children showed that variation in growth among children living in different environments was largely explained by differences in diet, although significant differences in relation to altitude, relief and rainfall patterns persisted. Other important determinants of child growth and nutrition were socioeconomic status, maternal education, marital status of the mother, and the father’s occupation. Further analysis showed that the geographical variation in child growth (see Figures 6.6.1 and 6.6.2) was significantly associated with the environment, diet, socioeconomic conditions, agriculture and demography. The authors of this study (Mueller and Smith 1999) concluded that most of the factors which were found to be associated with child growth were related in one form or another to differences in local subsistence agriculture and that agriculture is probably the main determinant of child growth and nutrition patterns in PNG.

Since 1983 when the NNS was conducted, the district boundaries have been changed. The results presented in Table 6.6.1 are in the districts as they were at the 2000 National Census. They were recalculated from the original survey results by Dr Ivo Mueller, PNG Institute of Medical Research, Goroka. Because of this recalculation, the new means will not be as statistically reliable as the original means. Nevertheless, in the absence of any other reliable information, they are presented here as a reasonable approximation of the situation in 1982–1983, within the borders of the 2000 census districts.

Districts in which the greatest proportion of children are significantly below the standard weight-for-length and length-for-age (lightest and shortest) are listed in the top left corner of Table 6.6.1. Conversely, in the bottom right-hand corner are the districts where the proportion of children who are taller and heavier is greatest. In the other corners are districts where children are either tall and light, or heavy and short. In the lightest and shortest corner are the districts of Nuku (Sandaun Province), Ambunti-Dreikikir and Maprik (East Sepik Province), Esá’ala (Milne Bay Province), Middle Ramu and Sumkar (Madang Province) and North Fly (Western Province). Districts in which most children are among the heaviest and tallest in PNG include Central Bougainville (Bougainville Province), Gazelle (East New Britain Province), Goroka and Unggai-Bena (Eastern Highlands Province), Karimui-Nomane (Simbu Province),2 North Wahgi (Western Highlands Province), Namatanai (New Ireland Province) and Talasea (West New Britain Province). These are all districts in which average cash income from cash cropping is high.

2005 National Micronutrient Survey

The National Micronutrient Survey was carried out between May and October 2005 by the PNG Department of Health, UNICEF PNG, and the University of Papua New Guinea to assess the

2 The inclusion of Karimui-Nomane district is a good illustration of how great care must be taken in the interpretation of information collected at the district level in PNG. Nomane children are highlands children who are in general heavier, shorter and more numerous than the children of Karimui, many of whom are seriously malnourished. The district has been created for administrative and political reasons and lumps together children of very different nutritional status.
Figure 6.6.1  Proportion of children stunted, or below the PNG standard length-for-age. **Note:** The National Capital District was excluded from this analysis. Source: National Nutrition Survey 1982–1983 data recalculated by Dr Ivo Mueller into the redefined district boundaries of the 2000 National Census.

Figure 6.6.2  Proportion of children wasted, or below the PNG standard weight-for-length. **Note:** The National Capital District was excluded from this analysis. Source: National Nutrition Survey 1982–1983 data recalculated by Dr Ivo Mueller into the redefined district boundaries of the 2000 National Census.
Table 6.6.1 Classification of districts by age-independent length (stunted) and height-independent weight (wasted) scores

<table>
<thead>
<tr>
<th>Per cent wasted[b]</th>
<th>Per cent stunted[a]</th>
</tr>
</thead>
<tbody>
<tr>
<td>&gt;= 60</td>
<td>50 to 59</td>
</tr>
<tr>
<td>&gt;= 10 Esa’ala</td>
<td>Middle Ramu</td>
</tr>
<tr>
<td></td>
<td>Ambunti-Dreikikir</td>
</tr>
</tbody>
</table>

[a] Length (for-age) score; expressed in terms of standard deviations from the national mean, independent of age.

[b] Weight (for-length) score; expressed in terms of standard deviations from the national mean, independent of height.

nutritional status of the sample population, to evaluate and better manage current health care practices, and to plan and implement new prevention programs and evaluate their impacts. The survey included preschool children aged six months to 59 months, non-pregnant women aged 15–49 years and men 18 years and older. The sample comprised 16 households each from 100 census units; all children in every selected household were surveyed and all non-pregnant women and all adult men from every second household. The census units were selected by PNGRIS environments (resource mapping units – see Section 1.15) and Region (see map on page xix). As well as anthropometry, the survey measured iodine intake, anaemia, and iron, vitamin A and protein deficiencies.

Preliminary results found that PNG children tend to be much shorter than the world average. Just over one-third of children measured were below standard length-for-age (stunted) and 17% of these children were severely stunted. Children in Momase

3 In the draft report of the National Micronutrient Survey, the height-for-age z-score of all PNG children measured (n = 895) was −1.58z, compared to the international standard mean of zero.

### Box 6.6 Measuring malnutrition in children

Malnutrition in children is measured indirectly, by measuring their physical growth. It is assumed that a child who is poorly nourished will grow more slowly than a child who is well nourished. Two measures are commonly used: weight-for-age and length-for-age. They can be combined into a third measure, weight-for-length.

The idea behind weight or length ‘-for-age’ is that normally children grow taller and weigh more as they get older, and their weight and length is directly associated with their age. If large numbers of children whose ages are known accurately are weighed and measured, then age can be correlated with weight and length. Then the average weight and length for a given age can be calculated, as well as the variation (standard deviation – often expressed as a ‘z-score’) that occurs in weight and length among individual children at different ages. These means and standard deviations for weight and length can be graphed against age to produce growth curves. The growth curves can be used as standards against which individual children can be measured.

Individual children whose ages are known can be compared against a growth standard to see how far above or below the mean weight and length they are for their age. Low weight-for-age means a child is wasted, or is thin. This can be the result of short-term malnourishment, caused by a temporary problem with food supply or, for example, the death of the mother, or a recent sickness. Low length-for-age, or stunting, is usually a sign of chronic, or longer-term malnourishment. A number of different standard growth curves for children exist and care must be taken when comparing children from a particular population against an international standard. In PNG, where many highlands children are shorter than children elsewhere, weight-for-length is a better measure for comparing children across PNG.

In the 1982–1983 National Nutrition Survey, PNG children were compared against their own mean growth curves, calculated from the survey data. In this way, the slowest-growing children in PNG could be compared against PNG standards. Many children in PNG fall below international standards for weight and length for age, but they appear not to suffer greatly from this and grow into normal, healthy adults. However, at Tari in Southern Highlands Province, a study found that when a child became significantly wasted or stunted, the probability of them dying within the next 18 months was greatly increased (Heywood 1982).
Region and in rural areas were most likely to be stunted. Southern Region children were least likely to be stunted.

Just over 25% of children measured had low weight-for-age (wasted) and the overall mean z-score was –1.13z. Children in Momase Region and in rural areas were most likely to be underweight. Children in Highlands Region were least likely to be underweight.

Body mass index was calculated for 722 non-pregnant women and 787 men. More women and men were overweight than were underweight. Overweight men and women were most prevalent in Southern Region (including Port Moresby) and in urban areas. Men and women with higher education were more likely to be overweight.

Mean birthweight was 3.06 kg. The highest prevalence of low birthweights (<2.5 kg) occurred in Southern Region.

Overall, iodine intake was adequate but was lowest in Highlands Region; iodised salt use was also adequate, but was lowest in Southern Region. Almost 50% of all children measured were anaemic (low levels of haemoglobin in the blood), and 70% of children aged 6–11 months were anaemic. The proportion of anaemic children in Momase and Southern regions was particularly severe. The incidence of anaemia in non-pregnant women was also severe, with 40% of all women anaemic and 60% of women in Momase Region anaemic. Fewer men were anaemic (26%), with a greater proportion of rural men than urban men suffering from anaemia. Anaemia in PNG men is a moderate problem by World Health Organization standards, but it is more severe in Momase Region. Anaemia was found to be significantly associated with malaria, but not with hookworm infections.

Throughout PNG, vitamin A deficiency was found to be a moderate problem, but was severe in Momase Region and in urban areas. Vitamin A deficiency was significantly associated with malaria.

Sources


From the 1950s to 1970s, land settlement schemes were a major part of the Australian administration's economic development strategy in PNG. The objectives of the schemes were to raise agricultural production and to demonstrate that individual titles to land were superior to customary tenure. Between 1952 and 1981, at least 130 land settlement schemes were started in every province in PNG except Western, Simbu and Madang provinces; 7203 blocks totalling 76,335 ha in area were made available over this period (Figure 6.7.1, Table A6.7.1).

The Commission of Inquiry into Land Matters in 1973 classified these schemes by the cost per settler. Using this method, three groups can be formed:

- Low cost schemes (less than K500 per family) – the government purchased land from landowners and gave it to land-short people to grow subsistence crops. The government had little or no further involvement.

- Medium cost schemes (K500 to K5000 per family) – the government planned the scheme layout, purchased and surveyed land, built roads, sometimes provided houses and water supply, and encouraged settlers to plant a single crop for sale, such as rubber.

- High cost schemes (K5000 or more per family) – highly planned and coordinated by the government, which purchased land, built roads, schools, health centres, port facilities and townships. Land titles contained covenants that forced people to grow a single crop for sale (oil palm).

Typical low cost schemes were the Gavien scheme north of Angoram and the Wosera (or Gawanga) resettlement scheme, both in East Sepik Province, or the Bakoiudu settlement in Central Province. The Wosera scheme involved the purchase of unoccupied land to the south-west of Wosera, owned by Gawanga people. The boundaries of the land were surveyed (but no internal subdivisions were made) and a road was built, by the villagers under government supervision, from Wosera to the land. The land was covered in tall secondary forest. After five years only 44 families had occupied the land, and these only on a part-time basis. After ten years, the road and bridges had been washed out.

The Gavien scheme, which started in 1967, was designed to provide agricultural land to Grass Country people who lived in swamps south of the Sepik River. It had a similar history to Wosera, with only eight families moving permanently to the 82 blocks provided by 1973. Then in 1977 it was upgraded as part of the East Sepik Rural Development Project (see Section 6.8) such that it became a medium cost scheme, with rubber as

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1 Much of the information in this section is drawn from papers by David Hulme (1982, 1983).
the main cash crop. The Bakoiudu scheme was low cost to the government, but was sponsored by the Catholic Church, which subsidised rubber prices for many years to stop people leaving their blocks and returning to their scattered mountain villages.

**Medium cost schemes**

Like the low cost schemes, medium cost settlement schemes have performed disappointingly and have frequently required expensive redevelopment projects to rescue them from complete failure. The best-documented medium cost scheme is the Cape Rodney Resettlement Scheme south-east of Port Moresby. The scheme was begun in the 1950s as 14 plantations leased by Australians and 300 small-holder blocks. The plantations failed, leaving the smallholders to continue on their own. The scheme was not linked by road to the rest of the province and had no education or health services. What services existed were provided by missions. A 1971 report described Cape Rodney as a ‘depressing shambles’. After nine years only 124 of the original 300 blocks had been occupied and only 300 ha of rubber had been planted of the 2129 ha of land available then. In the late 1970s the Magi Highway linked the scheme with Port Moresby. Throughout the 1980s and 1990s the scheme was the subject of a number of redevelopment attempts, but many of the settlers still have no formal title to their land and fresh food sales in Port Moresby remain the main source of their income. The rubber factory has been destroyed by fire twice (see Section 5.11).

![Figure 6.7.1 Area of land taken into land settlement schemes, 1959–1981. Source: Hulme (1982).](image)
Elsewhere in PNG, medium cost settlement schemes have survived by abandoning original plans and growing fresh food for urban markets. This was the case at Situm and Gobari in Morobe Province. Settlers on some schemes in Western Highlands Province now grow vegetables instead of the tea that the scheme was designed for. In Oro Province, a medium cost settlement scheme based on cocoa production that was abandoned because of pests and diseases was absorbed into high cost oil palm schemes in the 1980s. The medium cost schemes on the Gazelle Peninsula of New Britain, such as Vudal and Vunapaladin, are based on production of cocoa and fresh food and have been successful.

**High cost schemes**

All the high cost schemes in PNG are associated with oil palm (see Section 5.7) and take the form of a nucleus estate, surrounded by smallholders. They are established at Hoskins and Bialla in West New Britain Province, at Sangara in Oro Province, Hagita in Milne Bay Province and in New Ireland Province. At Hoskins, settlers came from East Sepik, Simbu and East New Britain provinces and initially local villagers were not involved. At Sangara, 50% of the settlers were from Oro Province, 18% from Morobe Province and 20% from Madang, Sandaun and East Sepik provinces. In Milne Bay and New Ireland, settlers came from within the provinces. The nucleus estates in Oro were established on abandoned plantations and smallholder resettlement blocks that previously grew cocoa, and on village land in New Ireland. The most recent land settlement schemes have been in the Bialla area of West New Britain Province, and these were established in the early to mid 1990s.

The oil palm schemes have been judged economically an outstanding success. The Hoskins scheme has recorded economic rates of return of 25%; settlers’ incomes have been well above PNG means for smallholders; a high proportion of settler loans are repaid; and blocks are sold and are in high demand. The schemes generate significant export earnings and are responsible for a large local labour market.

Whether these high cost oil palm schemes have been a social success is more equivocal. Critics have pointed to inter-ethnic conflicts, reasonably severe in the beginnings of the Hoskins schemes; second and third generation settler underemployment and criminal activity; alcoholism; prostitution; and malnutrition among settler children. The schemes were also blamed for underdevelopment in the surrounding villages. Some of these criticisms have proven groundless, but a number remain serious problems. Vigorous attempts have been made at Hoskins to involve the local villagers in producing oil palm on village land, and the village oil palm production has expanded significantly in recent years. At Popondetta and Milne Bay the villagers have participated enthusiastically. David Hulme points out that the Hoskins schemes were groundbreaking in that they were the first attempt to create a mixed ethnic community on a large scale in PNG.

**Other settlement schemes**

Since the mid 1990s, few new land settlement schemes have been established. However, the resettlement of refugees from natural and political disasters has resulted in the establishment of schemes, although these are not always formal settlements. In 1987, the East Awin Refugee Relocation Area was established east of Kiunga in Western Province for refugees from Papua Province of Indonesia. This settlement area was administered by the UN High Commissioner for Refugees and in 1992 had 3000 residents. Most of these settlers were not village farmers but were public servants, teachers, tradespeople and professionals and they required considerable support with food. The settlers were taught intensive farming methods and

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2 Descriptions of agriculture on various schemes in the early to mid 1990s are given in Working Papers of the Mapping Agricultural Systems of PNG Project. For example, System 1412 in Allen et al. (2002) covers the Gavien scheme in East Sepik Province. See the Working Papers for Central Province (System 0308, Cape Rodney settlement); East New Britain Province (System 1808, various schemes on the Gazelle Peninsula); Gulf Province (System 0205, Murua settlement); and West New Britain Province (Systems 1916, 1917, 1918, various oil palm settlements).
they sold fresh food to Ok Tedi Mining Ltd and also sold paintings and carvings in Kiunga. In 2004, PNG issued birth certificates to over 4000 children born at East Awin and residency permits to all eligible adults, which enabled them to leave the settlement area if they wished.

After the eruption of volcanoes near Rabaul in 1994, people from villages near Rabaul were allocated land on former plantations in the Warangoi Valley and at Sigute between the Warangoi and Sigute rivers, East New Britain Province. Refugees from the 1998 tsunami in Sissano Lagoon area of Sandaun Province have been settled on land inland of the lagoon. The eruption of Manam Island, Madang Province, in 2005 and 2006 has resulted in the displacement of about 10000 people from the island to former plantations in the Bogia area on the nearby mainland. Most Manam refugees had not been allocated land by late 2006, except for housing areas.

**Summary**

The low and medium cost settlement schemes in PNG are judged, in general, to have been only moderately successful or unsuccessful. On the other hand, the high cost schemes have been a marked success and have created considerable economic benefits. An important reason for this success has been the high price of palm oil, the commodity produced from the high cost schemes. In contrast, medium cost schemes based on rubber production have failed economically and socially, unless the settlers have had good access to urban markets and have been able to switch to fresh food production. The low and medium cost schemes were poorly planned and implemented and badly administered, an outcome of a critical shortage of well-qualified planners and experienced administrators. High cost schemes directly benefit a small number of people but may benefit large numbers of people indirectly by creating a strong agricultural export sector. Low and medium costs schemes, if they could be better planned and administered, would contribute to a broader improvement in rural living standards.

**Sources**


Rural development projects (sometimes known as *integrated* rural development projects) arose from a belief that it was possible to bring about sweeping economic and social change in poor rural areas through the application of rational, scientific knowledge. In addition, hierarchical control over appraisal, planning, implementation and the use of funds was required. Rural development projects were an extension of a belief that the characteristics of mature capitalist economies (industrialisation, modern scientific agriculture, infrastructure and improved social services) would bring about political stability within developing countries.

The largest of the international development agencies, the World Bank, had been successful in rebuilding Europe after World War II, but when it applied the same practices to bring about change in poor rural countries it had little success. In 1973, the president of the bank, Robert McNamara, recognised the bank’s failures. He announced a radical ‘redirection’ of effort, away from trickle-down theories to direct investment in poor rural areas in developing countries. Other developed country aid agencies around the world followed the World Bank’s example and began to use rural development projects to attempt to bring about economic and social improvements in poor rural areas.

PNG has been the recipient of a number of integrated rural development projects. A full evaluation of the outcomes of these projects and why they succeeded or failed to achieve their goals in PNG has never been undertaken. Assessments that do exist were done either during the life of the project (a mid-term evaluation, for example) or immediately on completion. A brief review by Crittenden and Lea in 1989 of PNG projects found that it was not possible to make broad generalisations on the outcomes achieved. They also found that the argument that the projects had done very little to accelerate development in poor rural areas was an oversimplification. Nevertheless, while it acknowledged that in rural PNG ‘everything is related to everything else’, the 1989 review argued that, far from being integrated, project components were disparate, separated in space and benefited only particular groups of people. Projects were integrated only by being implemented in a single province under a single management organisation.

Project (1993–1998) and Pomio–Bainings Rural Development Project (late 1980s to early 1990s). Only three of the largest projects are reviewed here.1

**East Sepik Rural Development Project, 1977–1984**

The East Sepik Rural Development Project was the first of the PNG integrated rural development projects. It was proposed as a means to achieve ‘total development’ through the delivery of a number of components that would address the problems faced by small farmers and the causes of rural poverty. It was also to deliver social services and meet the economic and infrastructure needs of the province. The components in the final plan were upgrades of existing activities, including the Gavien land settlement scheme (see Section 6.7), buffalo farming, inland fisheries, crop intensification, agricultural research and the construction of schools and an agricultural college. The total expenditure was US$14.87 million (around K97 million in 2005 values) provided in the form of a loan from the Asian Development Bank.

The Gavien settlement scheme was designed to benefit poor families who lived in swamps south of the Sepik River. The scheme required settlers to produce rubber, a cash crop with poor returns to labour in PNG, but it gave them access to urban markets for fresh food and to health and education services. Buffalo farming and inland fisheries failed. (A longer-term outcome was an Australian-funded aid project to shoot, from helicopters, buffalo that had escaped from the project, were infected with tuberculosis and were damaging village gardens.) The crop intensification program did not achieve many of its objectives, with the exception of the food and nutrition component. The agricultural college opened at Bainyik, but within ten years was closed due to lack of funds and today there is very little to be seen on the site.

The failures were blamed on poor planning; rushed implementation in order to qualify for the loan; a failure to relate the project to political, social and administrative realities in the province; overuse of foreign consultants (from a number of different companies, making control and coordination difficult); failure to train local staff; slowness in appointing project staff; severe administrative and procurement delays; carrying out research after rather than before the implementation of many agricultural subprojects; the use of completely new activities such as buffalo farming and fish ponds; frequent staff changes; poor monitoring; low economic returns to villagers of the proposed agricultural activities (for example, rubber and rice); and an extremely complex management structure.

**Southern Highlands Rural Development Project, 1978–1985**

The Southern Highlands Rural Development Project was started in response to a proposal to extend the Highlands Highway from Mendi to Tari in 1973. The new road gave 100 000 rural people access to domestic and international markets for the first time. The project was designed to help people take advantage of this, as well as to boost the internal rates of return on the road project and so justify it in economic terms. The main components of the project were to upgrade 138 km of road between Mendi and Tari; surface and upgrade 41 km of feeder roads to service proposed tea plantations; construct bridges and culverts on 900 km of feeder roads; establish 850 ha of tea, 1280 ha of coffee and 100 ha of cardamom, plus tea and coffee processing facilities; conduct food crop trials and extension work on food crops; and construct and operate secondary schools, a teachers’ college, a nursing school and health subcentres. The food crops component was added

1 Also excluded are the more focused projects including Agriculture Quarantine and Inspection Project, Australian Contribution to a National Agricultural Research System, Bougainville Cocoa Rehabilitation Project, Cocoa Quality Project, Agriculture Support Services Project, East New Britain Smallholder Development Project, Smallholder Livestock Credit Project, Milne Bay Nucleus Estate and Smallholder Project, Cape Rodney Smallholder Development Project and the Popondetta Smallholder Oil Palm Development Project. Post-project reviews of these projects are difficult to locate.
to counter the perceived adverse effects of cash cropping on food crop production. The education and health facilities were planned to raise the level of services to an underdeveloped area. The project cost was around US$32 million (K180 million in 2005 values) and was funded by a loan from the World Bank.

A project completion report judged the construction of roads, schools and health centres as successful and they were seen to be having a positive effect. The food crop trials and extension component was judged as less than successful. The cash crop components were ‘disastrous’, with only 260 ha of tea planted, 67 ha of coffee (of which 10 ha survived) and 18 ha of cardamom. The large cash crop plantations were abandoned. The provincial government failed to take over the operation and management of the project components.

The main reasons for the failure of the non-infrastructure components of the project were said to be trying to start too many activities at once, such that project management, implementation capacity and the provincial government ability to absorb them was overwhelmed (provincial government was established in Southern Highlands Province after the project had begun). Further reasons were a failure to train provincial staff; inflexibility and a failure to respond to changing circumstances over time; a lack of commercial orientation in the cash crops components and ‘incompetence’ in managing this component; and a serious loss of knowledge caused by the failure of foreign staff to write reports on the outcome of their work before leaving the project.

The Enga Rural Development Project grew out of the Enga Rural Development Study, which was instituted by the national government under the less developed areas sectoral program of the National Public Expenditure Plan. The Enga Provincial Government was responsible for the implementation of the project and the national government was only responsible for negotiating the loan and administering the funds. From over 200 possible projects arising from the Enga Rural Development Study, 40 were selected for the project. A final plan was produced in 1981 after appraisal by the World Bank. A loan was negotiated with the World Bank to provide funds from 1982.

The project included infrastructure (new office buildings, a remand centre, aid posts and health centres, road upgrading, hydro-electricity plants, sawmills, schools); a law and order component (Enga was the site of frequent inter-group fighting); community development; village food crop production and cash cropping systems (coffee, pyrethrum and cardamom); livestock management; vegetable marketing; industrial training; and improved province financial and management services.

Infrastructure and road upgrading was generally completed satisfactorily. However, the objectives of many of the other components either were not achieved, or failed to be sustained after the project was completed. An assessment of the project suggested that there were too many components; the project suffered from high staff turnover; excessive delays in recruiting staff; poor staff selection; poor training; lack of motivation; poor supervision; problems with securing land from customary owners; continued fighting and law and order problems that resulted in some infrastructure built by the project being destroyed; local political upheavals, sometimes associated with the fighting; personality clashes; and a loss of interest by the World Bank in the outcomes.

**Summary**

The Crittenden and Lea review of five PNG rural development projects recommended that future projects needed to be small and have a low budget; integrated into provincial planning structures; oriented towards training, institution-building and reform of local institutions; have local consent and commitment; have simple management and monitoring procedures; have low numbers of foreigners involved; and be properly evaluated. This review argued that the projects were not complete failures. The widely held perception that the projects failed was the result of comparing the outcomes with unrealistic objectives and with the manipulated cost-benefit analyses and inflated rhetoric that were used.
to justify their funding. More needs to be known about the long-term consequences of these projects, whether any parts of them were successful and the reasons for that success.

A workshop was held in Madang in 2004 on rural development ‘projects’ in PNG that had been successful. The workshop findings were published in the Development Bulletin No. 67 in 2005. The successful projects were small, low budget and, above all, were focused on the development of rural communities and not on whole provinces. The participants concluded that successful rural development in PNG will be community-based and focused on the transformation of local polities and economies.

Sources


6.9 Transport infrastructure

Infrastructure is usually understood to refer to roads, bridges, ports, airstrips, communication facilities, water supplies and dams, sewerage systems, and health and education facilities. Infrastructure is the physical structure that enables economic activities to take place, or the structures through which services are delivered. Infrastructure can be publicly or privately owned, but infrastructure in PNG remains almost all publicly owned, despite moves to privatise some port facilities and airports.

It is widely accepted that effective infrastructure is essential for economic growth and also makes a significant contribution to reducing poverty. Transport is critical for village access to markets, particularly to sell agricultural produce, and so for economic growth. Transport is also important for people to access health and education services. An inverse relationship exists between measures of poverty and access to markets, health and education services. Failure to maintain transport infrastructure, as has occurred in PNG in recent decades, constrains economic growth. This section describes the state of basic transport infrastructure in PNG, in particular roads, bridges, sea ports and airstrips.

Roads and bridges

The first major road in PNG was the Boluminski Highway, built on the east coast of New Ireland in 1910–1914. Prior to 1914, the German colonial administration built three roads on the Gazelle Peninsula and one each on Bougainville and New Hanover islands. During World War II there was a tremendous upsurge in road building activity, with both Allied and Japanese forces involved. This activity was continued after the war by the Australian administration. Many early roads were built with unpaid, local, hand labour and were little more than graded foot tracks. After World War II, roads for motorised vehicles were constructed all over the country, first by unpaid local labour and then with earthmoving equipment.

Many of the first roads in PNG were made through areas with the highest populations. This was partly because of the labour requirements for road construction and partly because colonial administrators sought to reach the greatest numbers of people for the lowest cost. Beginning in the 1950s, local road networks began to be linked together by trunk roads, constructed using machinery. These roads were built to enable the export of agricultural products, particularly from the highlands. The economic benefits of new roads were meant to cover the costs of construction and ongoing maintenance, and estimates of economic returns were supposed to
be prepared before the roads were built. However, many roads were built without cost-benefit analyses, on a perception of reasonable returns and an understanding that regional development would not take place without a road.

The outcome of this period of road construction in PNG is that the majority of the population now lives close to a road (Table 6.9.1). In 2000, 53% of the total population lived within 5 km of a national road and 70% lived within 15 km of a national road. A majority of people in PNG live within four hours walk of a national road. If district and rural roads are taken into consideration, a greater proportion of the population lives within 5 km of a road.

A number of provinces are particularly well served by roads (Figures 6.9.1, 6.9.2, Table A6.9.1). In Western Highlands and Simbu provinces, more than 70% of the populations live within 5 km of a national road; and in Southern Highlands, Central, Enga and East New Britain provinces more than 60% of the populations do so. Of the highlands provinces, only in Eastern Highlands do less than 50% of the population live within 5 km of a national road but, even here, only 30% are further than 15 km from a national road. In contrast, in Western and Milne Bay provinces, more than 70% of the populations live further than 15 km from a national road. More than 100,000 people live further than 15 km from a national road in each of Madang, Milne Bay, Eastern Highlands, Western and East Sepik provinces. In Morobe Province, more than 245,000 people (53% of the provincial population) live further than 15 km from a national road.

Residence near a road does not guarantee that the road will be trafficable all year round. Since about 1980, many roads and bridges have not been adequately maintained. As a result, many roads have deteriorated to the point where they are impassable when wet. When dry, they are so potholed and corrugated that damage is caused to vehicles travelling along them. Failure to maintain many bridges means that they have collapsed or must be crossed with care. Consequently, travel time and costs are greatly increased.

The PNG Road Asset Management System (RAMS) indicates that there were about 7300 km of national road in PNG in 2000 (Table 6.9.2). As a proportion of total road length, 22% of all national roads in 2000 were in a ‘poor’ condition; 36% in a ‘fair’ condition; and 42% were in ‘good’ condition. In seven provinces (Simbu, Enga, Manus, Bougainville, East New Britain, Southern Highlands and Western Highlands), more than 75% of national roads were in ‘poor’ or ‘fair’ condition. In Eastern Highlands, Sandaun, Madang, Central and Gulf provinces, less than half of the national roads were in ‘good’ condition. Only in Oro and New Ireland provinces were more than 80% of national roads in ‘good’ condition (Figure 6.9.3, Table A6.9.2).

In 2000, two-thirds of national roads were gravel-surfaced and most of the remainder were sealed. Roughly equal proportions of both sealed and gravel-surfaced roads were in ‘poor’ or ‘fair’ condition (Table 6.9.2). Along the full length of roads, ‘poor’ sections of road are interspersed with ‘fair’ and

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Table 6.9.1 Distance people live from a national road

<table>
<thead>
<tr>
<th>Distance from a national road[1]</th>
<th>Population</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Within 5 km</td>
<td>2,748,257</td>
<td>53</td>
</tr>
<tr>
<td>5 to 10 km</td>
<td>545,812</td>
<td>10</td>
</tr>
<tr>
<td>10 to 15 km</td>
<td>301,921</td>
<td>6</td>
</tr>
<tr>
<td>More than 15 km</td>
<td>1,594,796</td>
<td>31</td>
</tr>
<tr>
<td>Total population</td>
<td>5,190,786</td>
<td>100</td>
</tr>
</tbody>
</table>

[1] Distance is a straight-line distance and does not take into account the local terrain.

Sources: NSO (2002); PNG Road Asset Management System.

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1 Roads in PNG are classed as national, district and rural. The national government is responsible for maintaining national roads. Provincial, district and local level governments maintain all other roads. The details of national roads have been entered into a management database (PNG Road Asset Management System – RAMS). This enables estimates to be made of the number of people living a given distance from a national road. This is not possible for other classes of roads.

2 The database on national roads contains many errors and omissions. There is little provincial-level or national-level data on length and condition of district and rural roads.
Figure 6.9.1 Roads and ports in PNG. Source: PNG Road Asset Management System.

Figure 6.9.2 Total population (including urban and rural non-village populations) living within a given distance of a national road, by province. Note: Distance is a straight-line distance and does not take into account the local terrain. The urban populations of National Capital District and Lae City, which live within 5 km of a national road, have been excluded from this analysis (see Table A6.9.1). Sources: NSO (2002); PNG Road Asset Management System.
‘good’ sections. Thus a ‘poor’ section of road near an
urban centre affects traffic originating along its total
length, while impassable sections of road prevent the
movement of traffic beyond that point. The condition
of many district and rural roads is not known but,
anecdotally, most are in very poor condition.

The Medium Term Development Strategy (see
Sections 6.3 and 6.4) emphasises spending on
transport infrastructure, road rehabilitation and road
maintenance, but adequate spending on roads and
bridges will require a radical departure from how
the national budget has been allocated in the past. In
2002, the PNG Department of Transport estimated
that it would require K120 million to bring the roads
of PNG back to the condition they were in 1980, but
only K10 million was allocated for road maintenance
in that budget year. It was recently estimated that
only around 40% of what is required to maintain

Table 6.9.2  Length of national roads by surface and road condition

<table>
<thead>
<tr>
<th>Road surface</th>
<th>Poor</th>
<th>%</th>
<th>Fair</th>
<th>%</th>
<th>Good</th>
<th>%</th>
<th>Total road length</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dirt</td>
<td>23</td>
<td>100.0</td>
<td>0</td>
<td>0.0</td>
<td>0</td>
<td>0.0</td>
<td>23</td>
</tr>
<tr>
<td>Gravel</td>
<td>1,346</td>
<td>27.3</td>
<td>1,542</td>
<td>31.3</td>
<td>2,044</td>
<td>41.4</td>
<td>4,932</td>
</tr>
<tr>
<td>Sealed</td>
<td>285</td>
<td>12.0</td>
<td>1,072</td>
<td>45.1</td>
<td>1,019</td>
<td>42.9</td>
<td>2,376</td>
</tr>
<tr>
<td>Total</td>
<td>1,654</td>
<td>22.5</td>
<td>2,614</td>
<td>35.7</td>
<td>3,063</td>
<td>41.8</td>
<td>7,331</td>
</tr>
</tbody>
</table>

Note: The distances in this table are slightly different to those in Table A6.9.2. These differences occur in the original RAMS
document. These data refer only to national roads and do not include district or rural roads.
Sources: DWI (2001); PNG Road Asset Management System.

Figure 6.9.3  Length of national roads by road condition and province. Source: DWI (2001).
present main roads in a reasonable condition has been spent in an average year. The Highlands Highway is kept open by aid funds from AusAID, the Asian Development Bank, the World Bank, and mining companies.

The lack of maintenance of roads and bridges has a negative effect on marketing agricultural produce and on economic growth. It also makes it more difficult for rural people to access education and health services, as well as for wholesalers of food and other goods to transport these to where consumers can purchase them.

**Sea ports**

PNG sea ports provide a vital link between PNG and the world market, with more than 80% of exports shipped from ports. PNG has 22 declared international ports, but only 16 are operational. A number of publicly and privately operated minor wharves, jetties, and landings also exist around the country. In 2004, PNG ports handled slightly more than five million tons of general cargo and 195,000 twenty-foot equivalent units of containerised cargo.

The most important port in PNG is Lae, at the end of the Highlands Highway (Figure 6.9.1). Lae has no natural harbour; its port is constructed on land that is geologically unstable and the berths require continual dredging. In 2004, Lae port handled 51% of the general cargo and 56% of the containerised cargo that passed through PNG ports. About 50% of PNG exports and 90% of coffee exports are handled through Lae. The port also serves a major mine at Porgera in Enga Province, the gas and oil fields in Southern Highlands Province, and three gold mines in Morobe and Eastern Highlands provinces. Lae is also the main hub for coastal shipping to the smaller ports of Kimbe, Kavieng, Rabaul, Madang, Wewak and Kiena. Much of the sweet potato sold in Port Moresby's urban markets is grown in the highlands and shipped through Lae on coastal ships.

Port development and maintenance has not kept pace with the growth in cargo. Since 1995, container cargo at Lae has grown at 5% per year and general cargo at 2.5% per year. The current cargo volume and vessel types calling at Lae require at least four international berths with a total length of 800 m. Lae has only two berths suitable for international shipping with a total length of approximately 300 m, but the main wharf was being extended in late 2006. The storage and cargo marshalling areas are not sufficient to handle increasing cargo volumes and ship sizes. As a result, port congestion at Lae is frequent and imposes high costs on port users. Delays of 3–5 days have become common and cost international shipping companies about US$20,000 per day. Some companies are refusing to call at Lae and others are considering imposing congestion charges, which will translate into higher costs for importers and exporters (including village coffee growers). Port congestion also poses health and safety problems, and the issue of non-compliance with the International Shipping and Port Security Code. The wharf and shipboard facilities for handling fresh food are poor and much food is lost from damage inflicted during shipping from poor handling and unsuitable containers.

Port Moresby, despite being the capital city and having a magnificent harbour, is a less important sea port than Lae, particularly for agriculture. With no road connections to other regions in the country (Figure 6.9.1), exports from Port Moresby are mainly transshipped from coastal ships to international ships. Hence Port Moresby has a number of berths for coastal vessels but only one for overseas vessels. Copper concentrate from Ok Tedi mine is loaded on ships at Kiunga on the Fly River and transshipped to large international ore carriers in Port Moresby harbour. Crude oil from Kikori is loaded at the Kumul Platform in the Gulf of Papua. Some is shipped to the Napa Napa oil refinery in Port Moresby harbour where it is processed for domestic use and export.

Other main ports are:

- **Rabaul.** An important port for the export of cocoa and coconut products, with three international berths, one being a bulk coconut oil-loading berth. Rabaul is also an important coastal shipping focus. The 1994 volcanic eruptions did not damage the port facilities, although dredging is required.
Madang. An excellent harbour, but with more difficult and less reliable road connection to the highlands and thus overshadowed as a port by Lae. However, if further port development at Lae proves technically too difficult, Madang could be developed to take over some of Lae’s trade.

Wewak. Serves East Sepik and Sandaun provinces via the Sepik Highway, but is restricted in the size of ships that can be handled by the depth of water at the single berth.

Kimbe. On the north coast of West New Britain Province; is the main palm oil export point. In the last year, volcanoes to the east and west of Kimbe threatened to cause significant disruptions to this coastline, but a major eruption has not yet occurred.

Of the minor ports, Alotau, Kavieng and Oro Bay export palm oil, Lihir services the gold mine in New Ireland Province, and Kieta on Bougainville Island was the main port for the copper mine before the mine was closed by the civil war. Other minor ports include Aitape, Daru, Lorengau and Vanimo (Figure 6.9.1).

Maintenance on navigational aids has not been adequate and the situation has become critical. A joint venture project with the Australian Maritime Service began in 2004 to rehabilitate maritime navigation aids. The project will provide more lighthouses, day markers and buoys. The first phase began in Milne Bay and Port Moresby in 2004 and in the Islands Region in 2005.

People in the maritime provinces, such as Milne Bay, are especially dependent on marine transport. The infrequency, unreliability and slowness of domestic shipping in PNG is a major constraint to further agricultural and fisheries development as well as to delivery of services.

Airstrips

Aircraft have been particularly important in the development of PNG. Almost all inland centres began as small outposts established where it was possible to build a light aircraft landing strip. Light aircraft continue to be important where roads have not been constructed, mainly in mountainous country. In most cases, airstrips close once a road has been made to an area. About 490 airstrips existed in PNG in 2006; only 4% were sealed and about 80% were less than 900 m long (Table 6.9.3).

International airports offer opportunities for niche marketing of fruit and flowers to Australia and Asia. International services operate from Port Moresby only, and all international air cargo has to be transhipped through Port Moresby, although international flights are possible through Alotau, Mount Hagen, Nadzab (Lae) and Rabaul. Other provincial centres with airstrips capable of handling Fokker F28 jets are Hoskins, Kavieng, Lorengau, Madang, Vanimo and Wewak. Twin engine aircraft, such as the Dash 8, fly into Daru, Goroka, Kerema, Kungka, Kundiawa, Lihir Island, Mendu, Popondetta, Porgera, Tabulbil, Tari and Wapenamanda. Daily flights occur from Port Moresby to some of these centres.

Of greater importance are the large numbers of light aircraft landing strips in remote and isolated areas, where they serve as the only means of access other than walking. Following the fall of the kina relative to the US dollar in 1997 (see Sections 4.1 and 4.2), the cost of fuel and air travel has increased sharply. This has resulted in the withdrawal or reduction

### Table 6.9.3 Surface and length of airstrips

<table>
<thead>
<tr>
<th>Surface</th>
<th>Length (m)</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sealed</td>
<td>&gt;2500</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>1500–2500</td>
<td>13</td>
</tr>
<tr>
<td></td>
<td>900–1500</td>
<td>5</td>
</tr>
<tr>
<td>Unsealed</td>
<td>1500–2500</td>
<td>13</td>
</tr>
<tr>
<td></td>
<td>900–1500</td>
<td>57</td>
</tr>
<tr>
<td></td>
<td>&lt;900</td>
<td>402</td>
</tr>
<tr>
<td>Total airstrips</td>
<td></td>
<td>492</td>
</tr>
</tbody>
</table>


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3 Air Niugini flies to Brisbane, Cairns, Honiara, Hong Kong, Manila, Nadi (Fiji), Singapore, Sydney and Tokyo. Another company, Airlines PNG, operates services from Port Moresby to Brisbane and Cairns.
of services by light aircraft operators, including missions, to a number of places where passenger traffic is light or where people cannot afford to pay the increased cost. Some coffee was transported by light aircraft to provincial centres, but the cost of air freight relative to the price of coffee is now generally too great for coffee to be moved by air economically.

A recent review of the PNG Air Transport Industry by PNG’s Independent Consumer and Competition Commission concluded that PNG’s airports are below minimum standards.4 Lack of finance to maintain runways, terminal facilities and navigational aids; poor management through the Civil Aviation Authority (including an inefficient organisational structure and poor accounting practices); increasing fuel prices; decreasing numbers of customers; and law and order problems that contribute to increased operating costs for airlines are the main factors causing operating inefficiencies and posing safety concerns about the air industry.

Summary

PNG is relatively well provided with transport infrastructure. However, most roads, bridges, ports and airstrips were constructed prior to 1980 and in general have not been adequately maintained or developed to keep pace with increasing traffic and cargo. As a result, many national, district and rural roads are impassable when wet and in poor condition when dry. The most important sea port at Lae has frequent delays. The high cost of air travel and air cargo restricts the use of air transport for agricultural products, particularly perishable items such as vegetables and seafood. Sea and air navigational aids have also been allowed to deteriorate. Foreign aid is commonly the only source of funding keeping important roads, sea ports and airports in operation. The failure to maintain roads, bridges, sea ports and airstrips is a constraint to market agricultural produce and to economic growth.

Sources


4 The review was publicly released on 20 September 2006 and is available from the ICCC website at <http://www.iccc.gov.pg/home.htm>.
People are said to be in poverty when they do not have the necessities of daily living. Poverty is often associated with need, hardship and lack of resources across a wide range of circumstances. Poverty may involve a lack of sufficient essential goods and services, or a lack of wealth (including capital, cash, material goods and natural resources). Poverty is often associated with social exclusion, dependency, and an inability to live what is understood as a ‘normal’ life: for example, being unable to raise a healthy family or to educate children.

Poverty may be absolute or relative. Absolute poverty is measured against a set of standards that are consistent over time and between countries; relative poverty is measured against other groups of people in a particular social context. Poverty is measured by indices of consumption or of income. The measure may be developed by identifying the cost of a minimum dietary level or ‘basket of goods’, or it may be based on a level of income set at a certain proportion of median household incomes.

It is sometimes said in PNG that because everyone has access to land through customary landowning groups (see Section 6.1), as long as people are prepared to work hard, there is no reason for anyone to be hungry or poor. Therefore, this argument goes, people who are in poverty have only themselves to blame. Leaving aside the likelihood that not everyone in PNG has access to customary land (for example unmarried youths, women, migrants), there is a great deal of evidence, much of it presented elsewhere in this book, that a greater proportion of poor people live in rural areas than in towns. They commonly live in remote locations that are either mountainous, with high rainfall, high levels of cloud cover and poor soils, or live on flood plains that are inundated regularly, or on small islands. These poorest people have limited access to basic services, including health and education services and, importantly, to markets where they can sell agricultural produce in exchange for cash (see Section 1.14). They also have poor access to information and knowledge about important matters like health care, nutrition and political developments. They cannot afford to buy foods to supplement diets that are low in protein and oils. They are often poorly represented politically and are ‘invisible’ from the main centres of the country.

Since the 1960s, a number of studies have attempted to define ‘less developed’ areas using measures of food consumed, cash incomes earned, levels of health and education services accessed and numbers of public servants in a district. These studies did not use the term ‘poverty’, but the definitions of ‘development’ and ‘disadvantage’ used are similar to contemporary definitions of poverty. The areas these studies have revealed as being ‘less developed’ or ‘disadvantaged’ are summarised here as a set of maps (Figures 6.10.1 to 6.10.4). The type and quality of data varied between these studies, as did the definition of ‘disadvantaged’.
Figure 6.10.1 Provinces in which the average annual income from cash cropping was less than $4 per person in 1966. Source: Brookfield with Hart (1971:300).

Figure 6.10.2 Least developed districts in 1970. Source: Wilson (1975, Groups 5 and 6).
Figure 6.10.3 Least developed districts in 1980. Source: de Albuquerque and D’Sa (1986, Cluster 7).

Figure 6.10.4 Most-disadvantaged districts in 2000. These worst 20 districts out of 85 are ranked by land potential, agricultural pressure, access to services, income from agriculture, and child malnutrition rate. Source: Hanson et al. (2001:310).
For example, in the *Papua New Guinea Rural Development Handbook* (2001:300), it was estimated that 18% of the rural population were 'strongly disadvantaged' or 'moderately disadvantaged'. This estimate of the proportion of people who are poor is not the same in all surveys. Nevertheless, the broad pattern of poverty in PNG was established by these four studies.

In 1996, the World Bank funded the PNG Household Survey, the first nationwide survey of consumption and living standards in PNG. The survey was based on a random sample of 1200 rural and urban households, selected by census unit from the 1990 census and stratified by environmental conditions (elevation and rainfall) and the level of agricultural development (from PNGRIS and MASP – see Section 1.15). The survey collected information about education, literacy, occupation, employment (but not income levels), dwelling characteristics, agricultural assets, and inputs. It also collected data on all food consumed and other frequent expenses. The expenditure estimates include the monetary value of subsistence production, gifts of food received, and food held in the house, as measures of consumption. The survey also collected information on infrequent expenditure and durable items owned. Poverty lines were established for the five regions of PNG – National Capital District, Southern, Highlands, Momase and Islands (see map on page xix). As a result, it was estimated that 42% of PNG’s population lived in households in which the value of consumption per adult equivalent was below a poverty line. Of these households, 94% were in rural areas, making it clear that poverty in PNG is a rural problem. Statistical techniques were used to combine information from the sample household survey with the 2000 census and PNGRIS and MASP, to create disaggregated maps of predicted poverty in all districts in the country (with a known level of probable error) (Figure 6.10.5).

**The location of poor places**

The patterns of ‘poverty’ depicted in Figures 6.10.1 to 6.10.5 are broadly similar over the 40 years they cover. The poorest areas are located along the western end of PNG, along both sides...
of the highlands and down the length of the main mountain range, on the Finisterre and Sarawaget mountains and in inland New Britain. These areas are often located on mountains and are high and therefore relatively cold and wet, steep and subject to erosion, and are isolated from roads and urban centres. Some are also located in inland lowland areas, or on places that are flooded annually, or on small islands.

Places with these environmental conditions have probably always been ‘poorer’ than places with better environments. Evidence from nutrition surveys and other studies carried out in the 1950s and 1960s suggests that in many parts of PNG, before colonisation, subsistence food production and diets were such that people in many places were ‘vulnerable’ to higher rates of diseases and death. After PNG was colonised, these places did not attract investment in the form of infrastructure, plantations or village cash cropping. Where village cash cropping provided cash incomes, the ‘vulnerable’ pre-colonial diets were able to be supplemented with purchased, imported food that is high in protein, fats and oils. This has led to improved human nutrition, lower infant and child mortality, and higher population growth rates.

Colonisation resulted in the environmentally poorer areas of PNG being left behind, while the more favoured areas became ‘developed’. Colonial administrators, planters and missionaries were drawn towards the higher-potential land, with its higher population densities and easier access, and it was here that ‘development’ occurred, in the form of infrastructure construction (towns, roads, wharves) and plantation agriculture. Villagers were able to take advantage of these developments and rapidly adopted cash cropping. These are now the districts with relatively high personal cash incomes from cash cropping.

For these reasons, the eradication of poverty will not be easy or simple. It will require separate policies for economic growth and for poverty eradication, which take into account the environmental realities of the poorer areas. A World Bank assessment of poverty in PNG published in 2004 found that poverty levels have probably worsened as a result of a severe contraction in the PNG economy. The assessment also found that education services have not improved, health services have deteriorated, and almost every socioeconomic indicator is significantly worse in rural areas. It urges the use of poverty mapping to allow the identification and specific targeting of the poorest places and the urgent restoration of education and health services in rural areas.

Sources


